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REPORT OF
COOPERATIVE BLISTER RUST CONTROL WORK
IN THE EASTERN STATES
DURING 1929.

By

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FOREWORD

This report is based on a summarization and analysis of the yearly BR-3A forms submitted by the state leaders, and on general observations made by the federal supervisor. It summarizes the control work for all years, and especially gives the main facts regarding the 1929 activities. No attempt has been made to discuss future plans in this report. Such plans, particularly for 1930, have been prepared for each cooperating state. As copies of these plans have been furnished the state and federal offices, it does not appear advisable to repeat this information here.

SUMMARY OF ELISTER RUST CONTROL ACTIVITIES IN NEW ENGLAND
AND NEW YORK DURING THE PERIOD 1918 to 1929, INCLUSIVE.

Policy

During the period 1918 to 1921 inclusive, the Federal Government co-operated with the states, on a dollar for dollar basis, in experimental work to control blister rust. This work was conducted in each state under a co-operative agreement between the United States Department of Agriculture and the authorized state regulatory agency, the latter usually being the state forestry department. The control work was directed by the state officials under the general supervision of the Government, which paid a part of the Ribes eradication costs.

In 1922, a new program to secure the general application of control measures was initiated by the United States Department of Agriculture, the state regulatory agencies and the state extension services. This program has been in operation since that time. The object of this cooperative work is to accomplish the control of blister rust by furnishing pine owners the expert advice, leadership, and supervision needed to secure prompt and effective local eradication of Ribes in the pine growing regions. The Government is primarily responsible for furnishing each cooperating state with one or more trained agents, who function as leaders in control work. In addition, the Government conducts experiments and demonstrations to improve control practices, obtains data on spread of the rust, and gives general supervision and regional leadership. All federal cooperative expenditures are offset by state expenditures of at least equal amount. The cooperating state regulatory agencies are responsible for the following: (1) the administrative direction of the cooperative employees furnished by the Government; (2) Cooperating with counties, townships, associations, and individuals in control work; (3) providing adequate supervision and checking of local eradication of Ribes to secure effective destruction of such bushes; and (4), enforcing any necessary regulatory measures. The state extension services cooperate, wherever practicable, by making available such facilities of their organizations as will promote the control program.

The Scope Of The Problem

White Pine

According to a forest type survey made by our office in 1927, there are 8,221,167 acres of pine land in New England and New York classified as follows: pure pine, (80 percent or over) 2,679,587 acres; mixed pine (21 - 79 percent pine in mixture) 2,774,507 acres; and pine restocking in types other than pine, 2,767,073 acres. Of the total pine acreage, 75.6 percent is located in the three states of Maine, New Hampshire and New York. In addition to the above total pine area, there is a vast acreage containing less than 20 percent pine in mixture with other species. Also, millions of white pine are being planted each year. The following map shows the amount and distribution of pure and mixed (30-79%) white pine, based on town units, in New England and New York.

DISTRIBUTION AND ABUNDANCE OF WHITE PINE IN NEW ENGLAND AND NEW YORK — 1927

LEGEND



10-15

15-20

20-25

25-30

30-35



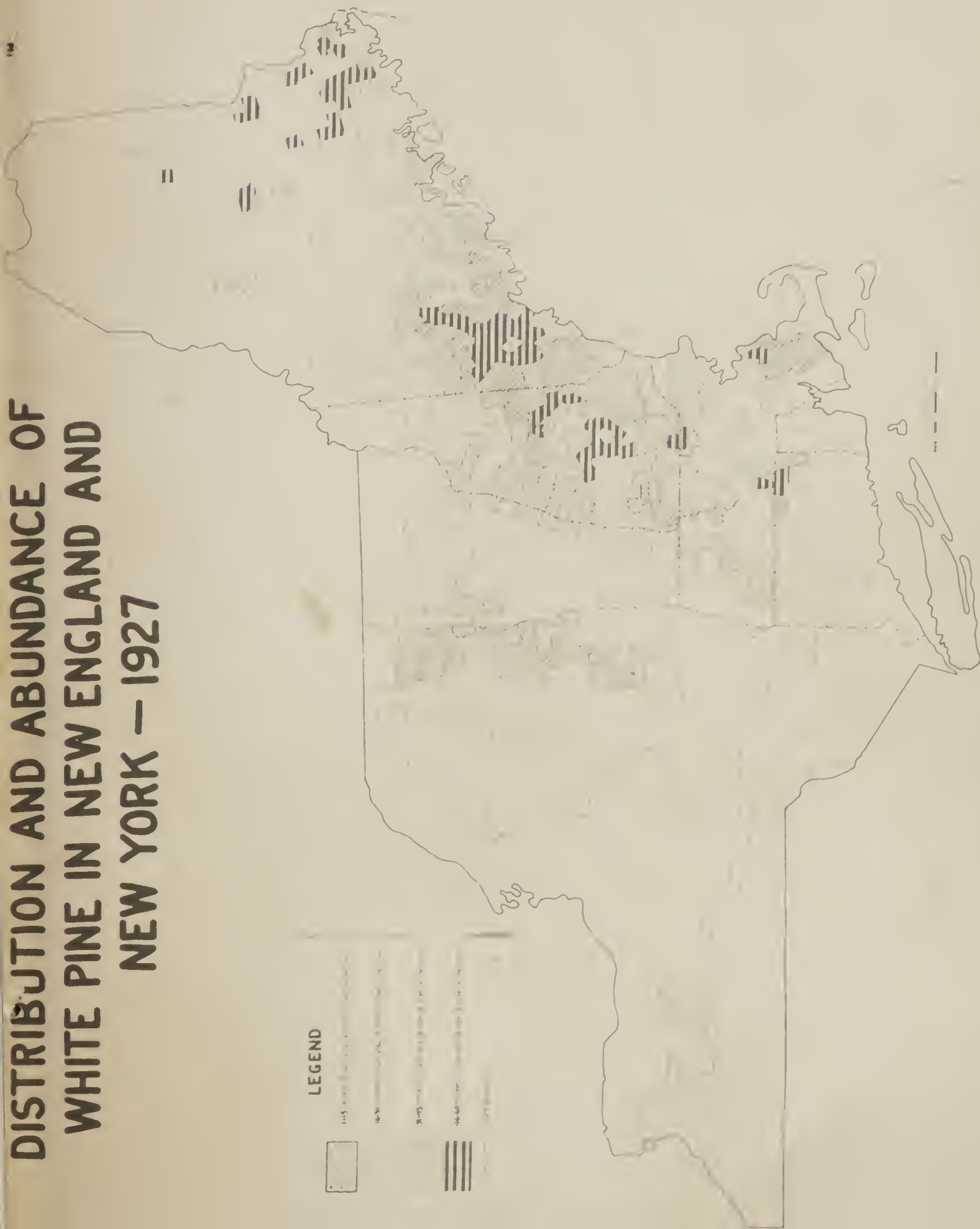
35-40

40-45

45-50

50-55

55-60



Ribes

Wild Ribes occur more or less generally distributed throughout the white pine regions of New England and New York, but very locally as to abundance, species, and site. Seven indigenous species have been encountered in control work, three being gooseberries and the other four currants (excluding Ribes vulgare which is considered an escaped cultivated red currant). In certain sites, the Ribes number 100 or more per acre, and in others are entirely absent. The aggregate, however, represents many millions of such bushes. It has been determined that shade is an important factor in eliminating and suppressing Ribes, that Ribes seed remain dormant and viable in the duff for years, and that disturbance of the duff by logging, fire, or animals favors the germination of such dormant seeds. Therefore, Ribes are found most abundant in open situations, such as recently cut over or burned areas, pastures, swamps, fence rows, etc. The cultivated Ribes problem is indicated by the 555,706 cultivated bushes that have been destroyed in applying control measures since 1916. The amount and distribution of wild Ribes per acre, based on town units, is indicated on the following map.

DISTRIBUTION AND ABUNDANCE OF WILD RIBES IN NEW ENGLAND AND NEW YORK

BASIS

NUMBER OF WILD RIBES PER ACRE OF LAND AREA* IN EACH TOWN

LEGEND

LESS THAN ONE WILD RIBES PER ACRE

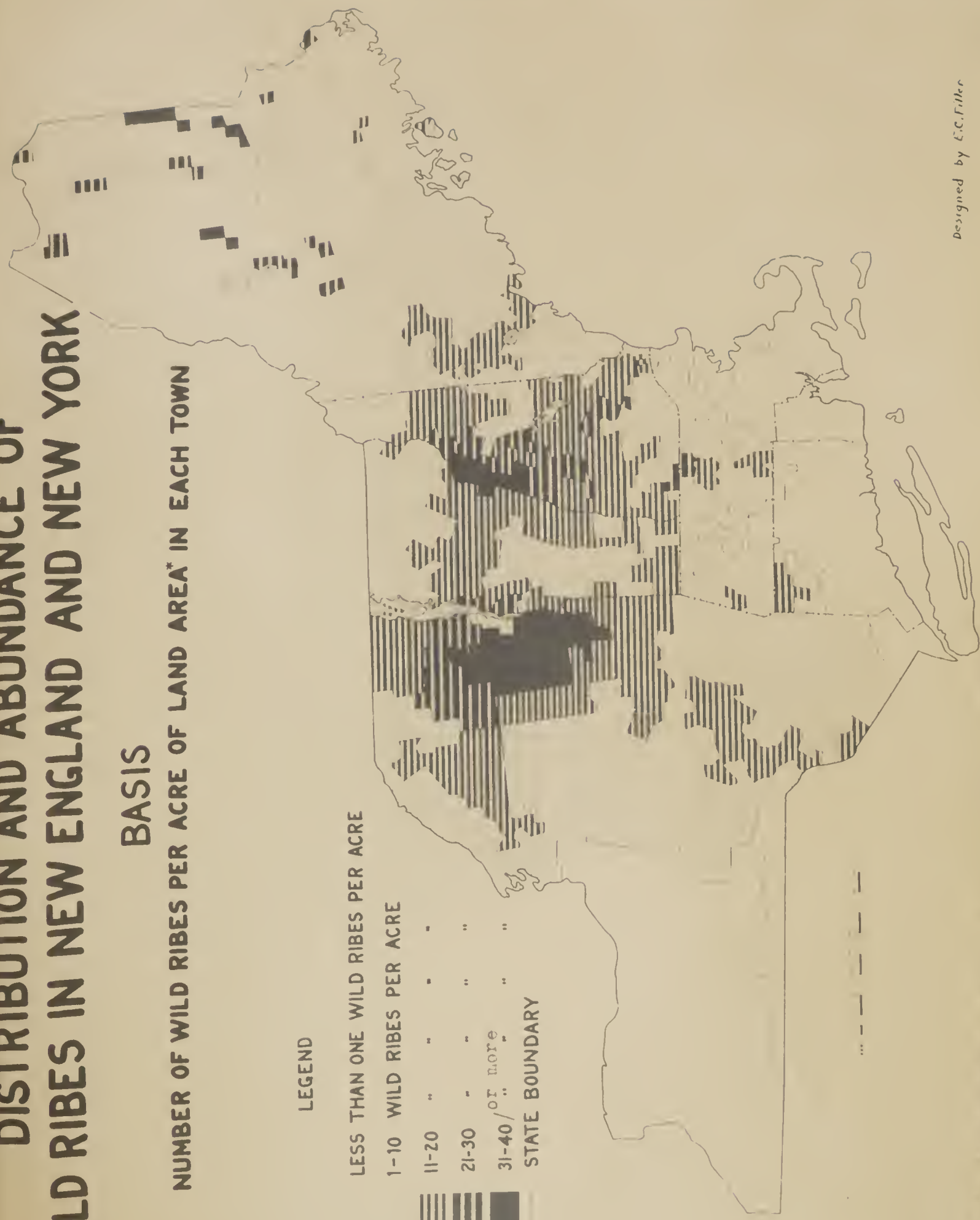
1-10 WILD RIBES PER ACRE

11-20 " " "

21-30 " " "

31-40 / or more " "

STATE BOUNDARY



*Acres of residential sections not included in land area.

Designed by E.C. Filler

Drawn by William Clave-M29

Infection:

Blister rust infection is general throughout the commercial white pine range of New England and New York. Over extensive areas, from 1 to 20 percent or more of the pines are infected; and in many local pine tracts, from 50 to 100 percent of the trees are dead or dying. The amount of disease varies considerably in different localities, and is closely related to the abundance of Ribes. In Essex and Warren Counties, New York, and in the upper Connecticut River valley region, where Ribes are generally abundant, pine infection is also heaviest; 11 to 20 percent of the trees being diseased. In southern New England and southern New York, less than one percent of the pines are infected, except in a few limited areas. The distribution and amount of disease, based on township units, is shown by the following map.

During 1920, strip line infection surveys were made in New Hampshire, Maine, Vermont, New York and Massachusetts. The pines on rod wide strips, totaling 165.9 miles in length, were examined. A total of 42,274 pines were inspected and 10.2 percent were found diseased. In addition, 256 plots, totaling 71.8 acres, were laid out adjacent to the strips; 27.7 percent of the 23,461 pines on these plots were infected. These data may be regarded as conservative of conditions in unprotected areas where Ribes are generally distributed; as since 1920, the results of the heavy wave of infection in 1919 have become increasingly conspicuous. Another heavy infection wave occurred in 1925.

Additional infection information was secured during 1925-1927 by the blister rust agents. Studies made by examining the first ten infected pines found on each of 415 representative pine areas in New England and New York showed cankers originated on the 4,150 infected pines as follows: Total cankers 10,428, of which 22 percent originated up to 1917, 43 percent during 1918-1921, and 35 percent since 1921. The percentage of infection since 1921 is probably too low to be representative of true condition. Many of the 1925 cankers were probably not visible at the time the study was made; also, in selecting infected trees, the agents naturally picked out specimens readily visible, rather than trees containing only incipient cankers.

DISTRIBUTION AND ABUNDANCE BLISTER RUST INFECTION ON WHITE PINES IN NEW ENGLAND AND NEW YORK

BASIS

THE ESTIMATED PERCENTAGE OF THE TOTAL NUMBER
OF WHITE PINES INFECTED IN EACH TOWN





Results Accomplished In Blister Rust Control
In New England And New York.

Education

Educational activities in blister rust control are necessary to create general and favorable attention, interest and desire. About 10 percent of the agents' time is given to such work. From 1922 to 1929, inclusive, the educational activities, definitely reported, are as follows:

Exhibits placed.....	4,404	Publications distributed.....	491,466
Items published.....	3,373	Posters and signs placed.....	58,514
Meetings addressed.....	3,831	Field Demonstration Meetings.	2,966
Attendance.....	274,084	Attendance.....	27,507

In addition, thousands of mimeographed articles have been distributed, many roadside demonstrations placed, scattered infected trees tagged, radio talks given, etc.

Service

Systematic personal service work, embracing personal interviews and instruction, is essential to secure general, prompt, and effective cooperation in applying control measures by individuals and towns. Such work occupied 14.1 percent of the agents' time in 1929. The amount of this work by the agents during the period 1922 to 1929, inclusive, is as follows:

Initial interviews.....	100,684	Individuals instructed in the disease....	39,256
Follow-up calls.....	52,328	Individuals instructed in control methods.	24,279

Individual and Town Cooperation in Ribes Eradication

Effective educational and service activities have resulted in willing and generous public cooperation in blister rust control. The amount of individual and town cooperation in Ribes eradication is as follows:

<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
1918-1921	381	\$ 40,596.22	166	\$ 27,560.00
1922-1929	29,642	353,502.04	1,009	305,620.30
Totals	30,023	\$394,098.26	1,175	\$333,180.30

Each cooperating company, association, or institution is classified as one individual cooperator. The individuals listed above actually furnished labor or money to eradicate the Ribes on their properties. Also, thousands of additional owners permitted the destruction of their cultivated bushes without compensation. The excellent public support in this respect is evidenced by the fact that although 437,537 cultivated Ribes were destroyed in the regular control work and 26,451 in connection with special black currant eradication and nursery sanitation projects, during the period 1922 to 1929 inclusive, yet it was only necessary to compensate 1,050 owners \$8,849.29 for 24,755 bushes. In other words, based on the total number of cultivated Ribes eradicated, compensation was paid for only 5.3 percent of the total bushes and averaged only 1.9 cents per bush. In addition to the above direct cooperation, thousands of individuals gave their general support and individual aid to the control program.

Individual cooperation in wild Ribes eradication has been solicited in all the Northeastern States. However, such efforts have been restricted in New Hampshire where the work is done chiefly in cooperation with towns, and in Rhode Island where, except during 1920, state funds have been used to pay the entire cost of the limited amount of necessary control work. In New England and New York during the period 1922 to 1929 inclusive, the cooperative Ribes eradication work with 29,642 individuals resulted in 1,822,235 acres being cleared of 33,443,396 wild Ribes and 269,393 cultivated bushes at a total cost of \$591,812.82, or a per acre cost of 32.5 cents. This cooperative work represents 27.1 percent of the total area eradicated of Ribes in New England and New York during this period. For detailed information by years and states see tables on page 120.

Town cooperation has been obtained chiefly in New Hampshire, Connecticut, and Maine. However, some town funds have also been secured in Vermont and Massachusetts. In New Hampshire, 800 town appropriations have made available \$263,300. for control work. This amount represents 79 percent of the total town money secured in New England since 1918. Many of the New Hampshire towns have consistently made yearly appropriations until their entire pine areas were cleared of Ribes. In fact, initial control work has been completed in 76 New Hampshire towns. During 1930, nine New Hampshire towns, which had never cooperated, made appropriations, and 14 other towns, which had appropriated only once, cooperated for the second time. The town money in New Hampshire is turned over to the state and expended with an additional 20 percent state funds to clear definite town blocks of Ribes, irrespective of property lines. A few towns in Maine and Connecticut have also been worked on the basis of town blocks. The total work on this basis since 1922 resulted in 1,894,050 acres being cleared of 20,305,106 wild Ribes and 77,116 cultivated bushes at a total cost of \$336,913.33, or 17.8 cents per acre; 96.1 percent of this acreage was in New Hampshire and 3.5 percent in Connecticut. During 1926 to 1929 inclusive, \$21,829.66 was expended on re-eradication work from 82 town appropriations made in New Hampshire, Maine, and Connecticut.

In Maine, town cooperation has been obtained since 1922; 346 town appropriations making available \$59,773.52 for control work. This

town money, except for a few thousand dollars, has been used to employ town foremen who aid the individual owners in eradicating Ribes concentrations on their properties. The ten town appropriations, totaling \$705.90, in Vermont have been used to pay the excess labor cost of foremen working with individual owners. Town money was secured in Massachusetts only during 1920 and 1921, when four appropriations, totaling \$1700, were made for control work in Berkshire County.

State work in eradicating Ribes - New England and New York.

Ribes eradication work, paid for entirely from state funds, may be divided into two classes; namely, public lands and individuals' lands. Control work on state forests has been conducted in all states except Maine, which does not own such land. Since 1922, a total of 129,395 acres of state forests (or 1.9 percent of the entire acreage cleared of Ribes in New England and New York) have been eradicated of 4,574,066 wild Ribes and 13,797 cultivated bushes at a total cost of \$153,033.26, or \$1.18 per acre. Of this total amount, New York has expended \$125,927.72 on 62,236 acres at a per acre cost of \$2.02 for eradicating 46.8 Ribes per acre. Also, most of the control work performed in New York prior to 1922 was on state lands. In the other states, very little state land work was done before 1922. Massachusetts ranks second in amount of control work on state forests, since 1921 having eradicated 1,379,083 wild Ribes and 7,395 cultivated bushes from 53,039 acres at a cost of \$22,311.63. Detailed summaries of state land projects are given on page 123 of this report. Initial control work has been completed on all pine lands in the state forests of New England, except a few small units in Massachusetts. New York has also completed about 80 percent of the initial Ribes eradication work needed in its state forests.

State control work on individually owned lands has been restricted to four states; Maine, Massachusetts, Rhode Island, and Connecticut. Since 1921, these states have cleared 2,874,367 acres of 1,555,251 wild Ribes and 77,067 cultivated bushes, at a total cost of \$114,493.00. This acreage represents 42.8 percent of the total area worked in New England and New York since that time. This work also represents an expenditure of four cents per acre for eradicating an average of half a bush per acre. In other words, such control work has been conducted on lands where the Ribes were so few and localized it was more efficient to do the control work by state scouts than to attempt to secure the cooperation of the individual owners. Most of this kind of work has been performed in Maine and Massachusetts. The percentage of the total acreage cleared of Ribes since 1921 in each state, that was worked on this basis is as follows: Maine - 67.1%; Massachusetts - 43.2%; Rhode Island - 99.3%; and Connecticut - 40.5%. In addition to the above, the state of Maine was compelled to enforce its state law in applying control measures during 1927 to 1929 on 140 acres of individually owned lands when the owners refused to cooperate. Detailed summaries of all state control work on individually owned lands are given on page 122.

Total Results Of Ribes Eradication Work In New England And New York
(1918 to 1929 Inclusive).

(Initial and Re-eradication Work)

Program	Period	Acreage	Ribes Pulled		Total Cost	Per Acre	
			Wild	Cult.		Cost	Ribes
Experimental work	1918-1921	1,036,903	14,399,785	91,718	\$389,442.75	\$.376	13.9
Application of control	1922-1929	6,720,237	60,393,332	437,537	1,196,356.27	.178	9.0
Totals	1918-1929	7,757,140	74,793,117	529,255	\$1,585,799.02	\$.204	9.6

During the experimental control work, the per acre costs were reduced from 72 cents in 1918 to 18 cents during 1921. Over 50 percent of the total acreage worked during this period is located in New Hampshire. In the general application of control measures since 1921, 85.7 percent of the total acreage cleared of Ribes is situated in the three states of Maine, New Hampshire, and Massachusetts. The per acre cost of control work during this latter period ranges from 7 cents in Maine to 86 cents in New York; the average number of Ribes per acre also vary in these two states, being 6.6 and 24.4 respectively.

The total acreage eradicated of Ribes since 1923 includes 481,899 acres reworked since that time. Of the total area reworked, 69.4 percent is in New Hampshire and 15.7 percent in Massachusetts. Over 72 percent of the total re-eradication work was performed during the period 1927-1929. Detailed cost and Ribes figures are only available for the period 1926 to 1929 inclusive. A summary of the re-eradication work during 1929 is given on pages 39 to 42.

Status Of Blister Rust Control In New England And New York - December 31, 1929.

<u>State</u>	<u>Total Acreage Cleared Of Ribes 1918 to 1929 Inclusive, (Excluding re-eradication)</u>	<u>Total Acreage Still Needing Initial Control Work (a)</u>	<u>% Total Control Area Cleared of Ribes</u>
Maine.....	2,381,142	593,457 (b)	80.0
N. H.....	2,188,771	598,668	78.5
Vt.....	164,040	135,623	54.7
Mass.....	1,608,185	80,487	95.2
R.I.....	272,682	250	99.9
Conn.....	200,788	25,600	88.7
N. Y.....	<u>459,633</u>	<u>468,816 (c)</u>	<u>49.5</u>
Totals	7,275,241	1,902,901	79.3

(a) This area is based on estimates, made by the blister rust control agents, of the remaining acreage still in need of initial Ribes eradication in the various towns of their districts. It includes both pine areas and protection zones.

(b) In Maine, there is an additional 411,871 acres, outside the agents' districts, consisting chiefly of mixed pine east of the Penobscot River; some of this pine may require protection.

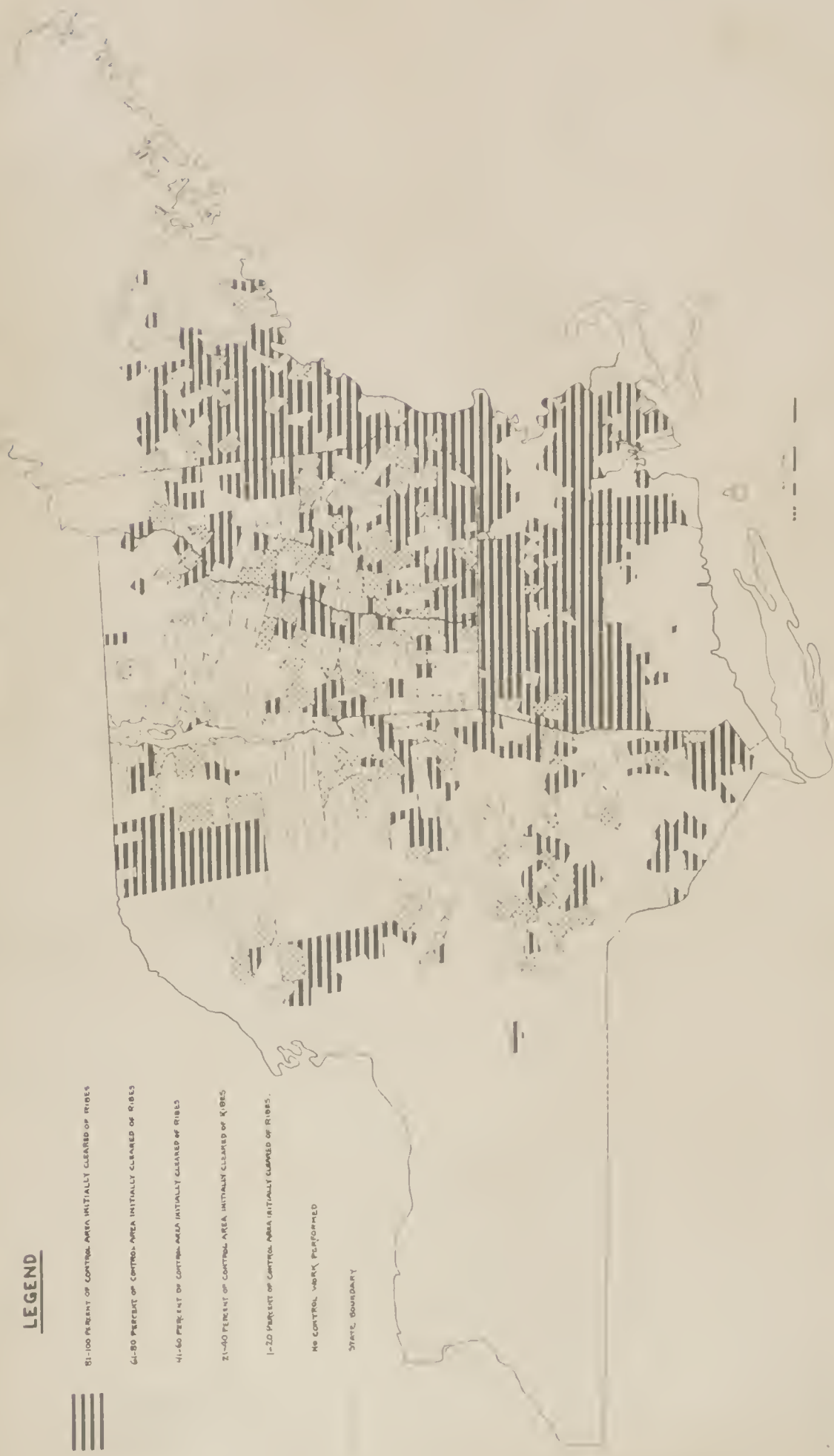
(c) Outside the agents' districts in New York, there is an area of 132,301 acres composed principally of plantations and mixed growth. No information is available as to how much of this acreage will need eradication of Ribes.

The status of control work in New England and New York is also depicted on the following map. It is based on the actual acreage initially cleared of Ribes in each town and estimates made, by the blister rust control agents, of the remaining acreage still in need of initial Ribes eradication in each town of their districts.

DISTRIBUTION AND AMOUNT OF BLISTER RUST CONTROL WORK IN NEW ENGLAND AND NEW YORK UP TO 1929 INCLUSIVE

LEGEND

- 81-100 PERCENT OF CONTROL AREA INITIALLY CLEARED OF RIBES
- 61-80 PERCENT OF CONTROL AREA INITIALLY CLEARED OF RIBES
- 41-60 PERCENT OF CONTROL AREA INITIALLY CLEARED OF RIBES
- 21-40 PERCENT OF CONTROL AREA INITIALLY CLEARED OF RIBES
- 1-20 PERCENT OF CONTROL AREA INITIALLY CLEARED OF RIBES
- NO CONTROL WORK PERFORMED
- STATE BOUNDARY



Designed by E.C. Filler
Drawn by William Clare-1930

Protection of White Pine Plantations

Adequate measures are being taken to protect the white pine plantings, in conjunction with the protection of natural pine, in all the agent districts of New England and New York. In four states (New York, Vermont, New Hampshire, and Rhode Island) the agents are supplied with a list showing the annual distribution of white pine stock from state nurseries. This procedure should be followed in the other states, as such lists are useful in securing cooperation. In Connecticut and New York, there is an abundance of planted pine outside the agents' districts. Some white pines have also been planted outside the agent districts in Vermont, but few of these plantations have been inspected. In Connecticut, where over 10,000 acres have been planted to white pine, these outside plantings are more or less naturally protected, due to the scarcity of wild Ribes. However, no systematic inspection of these plantations has been made. Such work is needed, especially to eliminate Ribes nigrum. In New York, where 56,458,488 white pines have been distributed from the state nurseries up to 1929 inclusive, systematic inspection of plantations, outside the agents' districts, was begun during 1928 in five counties and continued in 1929.

New York requires all prospective planters to sign an agreement, guaranteeing to eradicate all Ribes from the pine planting sites. Maine sends the planters special cards emphasizing the need for control, and attaches warning cards to each pine shipment sent from the state nursery. Also in New Hampshire, Rhode Island, and Vermont, a special letter, regarding the importance of control, is sent to each planter. It is essential that each state take definite action to make sure white pines are planted only on protected sites.

Black Currant Eradication

All cooperating states have taken (or are contemplating) action to eliminate the European black currants. Four states (New York, Rhode Island, Connecticut, and Michigan) have definite state laws which prohibit the possession of Ribes nigrum. In the other states, such bushes may be eradicated under authority given by the respective general cluster rust control laws. Five of the Northeastern States started systematic surveys during 1928 to locate and eradicate these bushes. The results accomplished in this work during 1928 and 1929 are as follows:

Black currant eradication work was completed in 39 Massachusetts towns during 1928 and 1929. A total of 7,111 Ribes nigrum were destroyed, including those eradicated in other towns in connection with the regular control work.

The special Ribes nigrum survey, conducted by the agents in Vermont during 1928 and 1929 in towns, resulted in black currants being

located on properties; of these bushes were eradicated.

In Rhode Island, a preliminary survey to locate *Ribes nigrum* was made in two towns during 1927. A total of 65 black currants in 12 plantings were located. These bushes were destroyed in 1928 when a total of 127 *Ribes nigrum* were eradicated in four towns. During 1929, all control work in Rhode Island was limited to systematic eradication of cultivated black currants. A total of 5,703 *Ribes nigrum* and 906 other cultivated *Ribes* were destroyed in 22 towns.

A systematic survey to eliminate *Ribes nigrum* in New York was started in 1928. This work has been confined chiefly to control areas and to the environs of nurseries. It resulted in 12,873 *Ribes nigrum* and 761 flowering currants being destroyed, exclusive of the black currants eradicated in connection with the regular control work. Such survey work was conducted as a special project in 26 towns in 6 counties during 1928, and in 47 towns in 11 counties during 1929. The revised New York blister rust law does not include flowering currants as one of the prohibited black currants.

A preliminary black currant survey was made during 1928 in Sheridan township, Claire County, Michigan, for the purpose of securing information as a basis for planning a state wide black currant eradication campaign. The project started as a black currant survey but developed into one covering all cultivated *Ribes*. Out of a total of 213 farms in the township, 80 had cultivated bushes as follows: 424 red currants, 215 gooseberries, 121 flowering currants, and 90 black currants. During 1929, systematic eradication of black currants was begun on a county wide scale. Five counties in the lower peninsula were completed and the greater portion of two counties in the upper peninsula were eradicated of black currants. This work resulted in 5,194 *Ribes nigrum* being destroyed.

In New Hampshire and Maine, all cultivated *Ribes*, including black currants, are eradicated in connection with the town control projects. It will, however, be necessary to make special arrangements for eliminating *Ribes nigrum* outside the agents' districts.

During 1930, systematic black currant work will be begun in Connecticut as a special project.

Nursery Sanitation

White pines must be grown under absolutely sanitary conditions, as regards *Ribes*, in order to prevent infection from blister rust. Initial control work, and some re-eradication of *Ribes*, has been completed around all pine growing nurseries in New Hampshire, Vermont, Rhode Island, and Maine; except in the latter state, there still remains some initial control work to be done around the Brown Company nursery. However, most of these

nurseries are located in Connecticut, Massachusetts, and New York. No state nurseries are maintained in Connecticut and Rhode Island. During the fall of 1927, 158 owners of nurseries in Connecticut were interviewed regarding blister rust control. Sixteen of the owners, desiring to ship pine out of New England, agreed to cooperate in maintaining official control areas around their nurseries. A preliminary Ribes survey of these areas showed 70 Ribes owners, possessing 1,014 cultivated bushes, would permit the destruction of the plants without compensation, and that 27 owners, having 567 bushes, were unwilling to cooperate. The attitudes of 28 additional owners of 342 bushes were not determined. As a result of the survey, control areas were established around eleven nurseries, and during 1928, 3,962 acres were cleared of 60 wild Ribes, 93 Ribes nigrum, and 333 other cultivated bushes. This sanitation work was continued during 1929 in the environs of 11 Connecticut nurseries, 5,960 acres being cleared of 1,182 wild and 1,814 cultivated Ribes. All except 380 acres was re-eradication work. Plans are being developed whereby the State will assume responsibility for the maintenance of protection zones around the commercial nurseries growing white pine in Connecticut; the nurserymen sharing the cost of sanitation work. All nurserymen interviewed in 1929 were favorable to this arrangement, and expressed their willingness to cooperate in amounts ranging from \$25 to \$100 annually.

In Massachusetts, all nurseries growing white pine for public sale were cleared of Ribes prior to 1925, and in each case a protection zone of 900 feet was also eradicated of such bushes. Infected pines had been found in three nurseries and the diseased trees destroyed. During 1925 and 1926, a special survey was conducted to eradicate all Ribes nigrum from within one mile of each state nursery and the more important pine growing commercial nurseries. In this work, a total of 217 Ribes nigrum and 319 flowering currants were destroyed. These bushes were owned by 155 persons, but claims were made by only ten persons for loss of 106 bushes. In 1927, the nursery sanitation work in Massachusetts was placed on a definite basis (of 1500 feet zones for wild Ribes and cultivated bushes other than nigrum) to agree with the federal requirements for shipment of pines outside of New England. During 1927 and 1928, control work was conducted around nine of the main commercial nurseries, and 4,942 wild Ribes and 3,345 cultivated bushes were destroyed. Fifty persons claimed \$647.15 for loss of 1,400 cultivated Ribes. Spot pine infections were found in six Massachusetts nurseries during 1928, but no new outbreaks were located. The state policy of establishing Ribes-free conditions around only the more important white pine producing nurseries was continued during 1929. It is believed that expenditures for such work around any additional nurseries would not be justified due to the relatively limited number of white pines grown. Sanitation work was carried on during 1929 around four commercial nurseries owning areas in eight towns. A total of 720 wild Ribes, 104 black currants, and 1,131 other cultivated Ribes were destroyed. Only 11 claims for reimbursement were received for the loss of 106 cultivated bushes. Three of the Department of Conservation nurseries were also examined, but no Ribes were located. The annual inspection of the Massachusetts nurseries in 1929 by state inspectors resulted in six infected trees being found in three nurseries. Future sanitation work will be

limited to re-inspections of the environs of those nurseries which have been initially protected.

During the past several years, sanitation measures have been applied to protect the pine areas in the New York State nurseries. The protection zones were for some time maintained at 900 feet. During 1928, this distance was increased to 1500 feet for all Ribes except nigrum, which was eradicated within one mile of the pine areas. To date, this latter species has been eliminated within a mile of each of the five state nurseries. The 900 foot Ribes free zones have been completely extended to 1500 feet around three of these nurseries and partially finished around the other two. In addition to the state nurseries, there are about 300 commercial nurseries in New York, but only a few of these grow any appreciable amount of white pine. During 1928, the first attempt was made to establish protection zones around some of these nurseries, especially in Wayne and Westchester Counties. Due to the abundance of cultivated Ribes and the fact that compensation had to be paid for such bushes destroyed, it was apparent that the sanitation work would have to be limited. Therefore, it was restricted to a general survey to determine and record Ribes conditions in the environs of the nurseries and to the eradication of Ribes nigrum in such situations. According to the revised state blister rust law, effective February 17, 1930, no compensation shall be paid by the State for any species of Ribes destroyed in connection with the establishment of Ribes-free zones around commercial nurseries, but fair compensation must be paid for such bushes by the person owning or operating the protected nursery.

Blister Rust Studies

Although there has been no special funds or personnel available to conduct surveys and field investigations in blister rust control, considerable work of this type has been performed at odd times by members of the organization. A brief summary of this work follows.

Surveys

A cultivated Ribes census was made in Massachusetts during 1917 - data compiled and a summary report prepared - used as a basis for later inspections and in eradication of Ribes nigrum. Detailed white pine surveys made in Vermont, Rhode Island, Connecticut, and parts of Maine and New York - field data summarized and pine areas plotted on maps - information used by agents in planning their work - detailed reports have been submitted on the completed surveys, and the information used for educational and supervisory purposes. Surveys on production, value and use of white pine and other woods completed in Vermont - production survey finished in Rhode Island - these data have been summarized and reports published - information used for educational purposes. A survey of forest resources in New Hampshire was completed by the State Forestry Department in 1924, and the data published

in bulletin form. Strip line infection surveys were made during 1920 in New Hampshire, Maine, Vermont, New York, and Massachusetts - the pines on rod wide strips, totaling 165.9 miles in length, were examined - a total of 42,274 pines were inspected and 10.2 percent were found infected - 256 plots, totaling 71.3 acres, were laid out adjacent to the strips; 27.7% of the 23,461 pines on these plots were diseased - the information has been used for educational purposes in various published statements. Cartographical survey made in all states during 1926 and 1927 to determine, by towns, forest conditions, especially white pine, Ribes, and infection - data summarized and maps prepared at the Boston Office, as a basis for the epidemiology study. During 1928, the New Hampshire agents conducted a survey in 69 backward towns to locate and map the minimum control area, which should be cleared of Ribes to protect the pine crop. Partly as a result of this survey, over 30 percent of these towns appropriated for control work in 1929.

Investigations

Demonstration areas of blister rust control established in all states - reports submitted on various studies - data used as a basis for determining costs of Ribes eradication, and for obtaining comparative figures. Effectiveness of control studies were made in all states prior to 1927, except Vermont - reports submitted on these studies, but only Kittery Point study has been published. Blister rust damage plots laid out in all states, except Rhode Island - plots used for demonstration purposes and data summarized for educational use of agents. Detailed studies made in all states of spread and development of infection from definite sources, except in Rhode Island and Connecticut - reports submitted on each study, only Kittery Point study has been published. Cutting out of cankers experiment made in Massachusetts - part of the results published in bulletin form by Martin, Posey, and Gravatt. Sample forest type maps made during 1919 of two towns, (Dover and Kensington) in New Hampshire and one in Massachusetts, (Duxbury) - detailed maps and estimates prepared - established effective method of mapping and estimating; town data used by agents for educational purposes and as a basis for control work. Selective eradication and Ribes ecology studies made by Fivaz in New York - preliminary reports submitted. Skunk currant study by Clave and Ferry in Massachusetts - preliminary report given at 1927 annual conference showed only restricted spread of disease from such bushes. Crew method study by Riley in Connecticut - preliminary report presents no definite conclusions. Study begun by Clave to determine effectiveness of sodium chlorate in killing skunk currants - preliminary report given at 1928 annual conference. Special study conducted by New York agents in 1928 to ascertain effectiveness of control - preliminary summary prepared by Boston Office shows pines examined for infection in 30 acre plots, 15 of the plots being in areas cleared of Ribes and 15 in comparable unworked tracts - since the time of Ribes eradication, 15 times as much pine infection has originated in the unprotected tracts as in the protected areas. Similar studies on the effectiveness of control were made, during 1928 and 1929, in Maine, New Hampshire, Vermont, and Massachusetts. The New York agents also laid out additional plots in 1929.

These data have been summarized at the Boston Office, and copies of the summaries sent to Washington and the respective state leaders. A report of the entire study is now in preparation at the Washington Office.

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A summary of blister rust control activities in each cooperating state for the period 1918 to 1929, inclusive, is given on pages 79 to 116.

1. The first part of the report is devoted to a general description of the work done during the year. It includes a summary of the results of the various experiments and a discussion of the progress made in the different branches of the research.

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2. The second part of the report contains a detailed account of the experiments carried out during the year. It describes the apparatus used, the methods employed, and the results obtained. The experiments were designed to investigate the effect of various factors on the rate of reaction.

COOPERATIVE BLISTER RUST CONTROL WORK IN NEW ENGLAND
AND NEW YORK DURING 1929.

Summary of Results Accomplished in Blister Rust Control
In New England and New York During 1929.

<u>Education</u>		% Increase or Decrease 1929 Over 1928.
	<u>1929</u>	
Meetings addressed.....	204	-43.8
Attendance.....	23,729	+12.0
Field demonstration meetings.....	70	-56.0
Attendance.....	1,898	-32.4
Displays placed.....	358	-27.2
Mimeographed articles distributed.....	23,155	+54.8
Publications distributed.....	52,332	-16.5
News items published.....	769	-30.7
Posters and signs placed.....	4,388	-39.6
 <u>Service</u>		
Initial interviews.....	9,013	-42.4
Follow-up calls.....	6,503	-24.6
Individuals instructed in disease and damage.....	4,146	-26.9
Individuals instructed in control methods.....	2,595	-20.9
 <u>Individual Cooperation</u>		
Number individuals (Wild & cult. Ribes eradication.....	3,353	-1.1
cooperating in (Cult. Ribes eradication only.....	1,016	+2.5
(General support only.....	4,996	-23.3
Amount expended by individuals on control work....	\$50,449.29	-7.7
Number of states in which individuals cooperated.....	6	Same
 <u>Town Cooperation</u>		
Number cooperating towns.....	156	+7.6
Number states in which towns cooperated.....	4	Same
Amount of town money appropriated.....	\$41,385.23	+0.6
Amount of town money used.....	\$41,323.28	+5.9
 <u>State Cooperation</u>		
Number states cooperating.....	7	Same
Amount state (appropriation) funds used (all projects).....	\$134,292.63	+6.9

<u>Ribes Eradication</u>		% Increase or Decrease 1929 Over 1928.
	1929	
Acreage cleared of Ribes.....	919,755	+4.5
Acreage of re-eradication work.....	131,492	+15.6
(Included in above total figure on area cleared of Ribes)		
(Wild.....)	7,262,127	+8.7
Ribes eradicated (Cultivated.....)	74,654	+28.2
(Total.....)	7,336,781	+8.9
Total Cost (Ribes eradication).....	\$171,294.60	+8.4
Cost per acre.....	.186	+3.3
Ribes per acre.....	7.9	+3.8

<u>Ribes Compensation</u>		
Number persons compensated.....	463	+155.8
Total bushes paid for.....	3,310	+2.0
Total cost of compensation.....	\$1,445.81	+13.0

<u>Personnel</u> (Cooperative Control Work)		
State leaders.....	5	-16.7
Blister rust control agents (permanent).....	32	-3.3
Blister rust control agents (temporary).....	22	-4.3
State eradication assistants.....	9	Same
State checkers.....	4	Same
Foremen.....	196	-8.8
Scouts.....	29	-29.3
State laborers.....	535	+29.8
Owners' laborers.....	7,097	+1.5
Total number men employed in field work.....	7,929	+2.5
(Regardless of length of time each worked)		

<u>Classification of Funds Used</u>		
State Appropriations.....	\$134,292.63	+6.9
Nursery funds.....	3,256.79	-18.5
Town appropriations.....	41,323.28	+5.9
Individual funds.....	50,449.29	-7.7
All other state funds.....	2,201.88	+251.0
Federal \$ for \$ money.....	120,139.95	-8.4
Total expenditures.....	\$351,663.82	-0.9

DETAILED SUMMARY AND ANALYSIS, BY STATES, OF
COOPERATIVE CONTROL ACTIVITIES IN NEW ENGLAND AND
NEW YORK DURING 1929.

DETAILED SUMMARY AND ANALYSIS BY STATES OF COOPERATIVE CONTROL ACTIVITIES
IN NEW ENGLAND AND NEW YORK DURING 1929.

EDUCATIONAL ACTIVITIES OF PERMANENT AGENTS IN NEW ENGLAND AND NEW YORK - 1929.
BASED ON TOTALS AND AVERAGES FOR EACH STATE.

State	Meetings Addressed		Field Dem. Meetings		Displays Placed		Mimeographed Articles Dist.		Publications Distributed		Items Published		Posters and Signs Placed	
	Total	Ave. Per Agt.	Total	Ave. Per Agt.	Total	Ave. Per Agt.	Total	Ave. Per Agt.	Total	Ave. Per Agt.	Total	Ave. Per Agt.	Total	Ave. Per Agt.
Maine	19	4.8	5	1.3	24	6.0	362	90.5	4501	1125.3	28	7.0	795	198.8
N. H.	95	13.6	12	1.7	115	16.4	20556	2936.6	17983	2569.0	365	52.1	957	136.7
Vt.	21	15.0	18	12.9	45	32.1	12	8.6	2742	1958.6	18	12.9	472	337.1
Mass.	34	6.7	18	3.5	121	23.7	386	75.7	11750	2304.0	201	39.4	259	50.8
R. I.	16	16.0	4	4.0	4	4.0	920	920.0	3830	3830.0	19	19.0	167	167.0
Conn.	4	4.0	-	-	15	15.0	-	-	521	521.0	29	29.0	36	36.0
N. Y.	13	1.8	4	0.6	20	2.8	919	127.6	7653	1062.9	106	14.7	689	95.7
Totals	202	7.6	61	2.3	344	12.9	23155	867.2	48,980	1834.5	766	28.7	3375	126.4

In addition to the above educational accomplishments by the permanent blister rust control agents, the educational activities of 18 temporary men employed in Maine produced the following results: Two indoor meetings attended by 210 persons, 9 field demonstration meetings with an attendance of 55 individuals, 12 displays, 2856 publications distributed, 3 news items published, and 1012 posters and signs placed. Also, in Connecticut, three temporary agents distributed 496 publications, placed 2 displays and 1 poster. Although the educational work of these temporary agents represented only a small proportion of the total amount of such work in New England and New York; yet in Maine, these men held 9.5% of the indoor meetings and 64.3% of the field demonstration meetings, placed 33.3% of the displays, distributed 38.8% of the publications, published 9.7% of the news items, and placed 56% of the posters and signs.

In Massachusetts, Agent Brockway published 128, or 63.7% of the total number of news items in that state.

The New York totals and averages are based on the work of all the regular blister rust control agents.

SERVICE ACTIVITIES OF PERMANENT AGENTS IN NEW ENGLAND AND NEW YORK - 1929.
 BASED ON TOTALS AND AVERAGES FOR EACH STATE.

State	No. Initial Interviews		No. Follow-up Calls		No. Individuals Instructed in			
					Control Methods		Disease	
	Total	Ave. Per Agent	Total	Ave. Per Agent	Total	Ave. Per Agent	Total	Ave. Per Agent
Maine	675	168.8	547	136.8	136	34.0	309	77.3
N. H.	1665	237.9	2070	295.7	260	37.1	1162	166.0
Vt.	793	566.4	702	501.4	257	183.6	352	251.4
Mass.	2061	404.1	673	132.0	383	75.1	365	71.6
R. I.	130	130.0	152	152.0	24	24.0	3	3.0
Conn.	122	122.0	317	317.0	58	58.0	118	118.0
N. Y.	1503	208.8	1509	209.4	449	62.4	538	74.7
Totals	6949	260.3	5970	223.6	1567	58.7	2847	106.6

In addition to the above service items, the 18 temporary agents in Maine made 1961 initial interviews and 533 follow-up calls, instructed 1234 persons in disease and damage, and demonstrated control methods to 963 individuals. The temporary men in Connecticut also made 103 initial interviews and instructed 65 persons in the disease, damage and control methods. This service work of the temporary agents in Maine represents 74.4% of the initial interviews in that state, 49.4% of the follow-up calls, 80.0% of the number of persons receiving field demonstrations in disease and damage, and 87.5% of those given demonstrations in control methods.

The New York totals and averages are based on the work of all the regular blister rust control agents.

COOPERATIVE RIBES ERADICATION IN NEW ENGLAND AND NEW YORK DURING 1929.

(Based on totals and per acre values for each state,
including both initial and re-eradication work)

State	No. Acres Examined	Ribes Pulled		Total Cost	Per Acre Values	
		Wild	Cult.		Cost	Ribes
Maine	233,543	2,090,340	18,244	\$20,958.98	\$.090	9.0
N. H.	252,144	2,102,999	6,644	40,609.40	.161	8.3
Vt.	13,300	110,671	453	6,495.47	.488	8.3
Mass.	258,415	841,039	31,646	29,729.73	.115	3.3
R. I.	No wild Ribes eradication work performed during 1929.				-	-
Conn.	34,597	134,407	10,922	8,034.54	.232	3.9
N. Y.	127,756	1,932,671	6,745	65,466.48	.512	15.5
Totals	919,755	7,262,127	74,654	\$171,294.60	.186	7.9

Comparison, By States, Of Acreage Eradicated Of Ribes and Per Acre Costs In
New England and New York During 1928 and 1929. (Initial and Re-eradication Work)

State	Acreage Eradicated		Percent + or - in acres eradicated over 1928	Cost Per Acre		Increase or Decrease in Per Acre Cost 1929 Over 1928	Increase or Decrease in Ribes per Acre 1929 Over 1928
	1929	1928		1929	1928		
Maine	233,543	203,067	+15.1	\$.090	\$.111	- .021	+ 1.1
N.H.	252,144	228,530	+10.3	.161	.179	- .018	- 1.8
Vt.	13,300	16,767	-20.7	.488	.411	+ .077	- 1.2
Mass.	258,415	239,033	+ 8.1	.115	.111	+ .004	+ 1.1
R.I.	-	21,461	-	-	.119	-	-
Conn.	34,597	75,105	-53.9	.232	.107	+ .125	+ 2.3
N.Y.	127,756	95,849	+33.3	.512	.528	- .016	- 4.9
Totals	919,755	879,812	+ 4.5	.186	.180	+ .006	+ 0.3

No wild Ribes eradication work was conducted in Rhode Island during 1929. Control activities in this state were confined to cultivated black currant work. A total of 6609 bushes (not included in the regular eradication summaries) were destroyed in connection with this project. A

detailed summary is given on page 93 of this report.

Despite the fact that no wild Ribes work was conducted in Rhode Island, 4.5 percent more acreage was cleared of Ribes in New England and New York during 1929 than in 1928. All states, except Connecticut, Vermont, and Rhode Island applied control measures on a greater acreage in 1929 than during the preceding year. The large decrease in Connecticut was due primarily to a decrease of 39,182 acres in the amount of area examined by scouts. The increase of 33.3 percent, or 31,907 acres, in New York is especially noteworthy.

DETAILED SUMMARY AND ANALYSIS BY STATES OF THE PROJECT "RIBES ERADICATION"
IN NEW ENGLAND AND NEW YORK DURING 1929.

This information will be summarized and discussed according to the three following classes of Ribes eradication: (I) Initial and Re-eradication (pages 26 to 33), (II) Initial work (pages 34 to 38), and (III) Re-eradication work (pages 39 to 42). Each of these three classes is further subdivided into the four kinds of control work, namely: (A) Individual Cooperation, (B) Town Cooperation, (C) State work on individuals' lands, and (D) State work on public lands.

I.- INITIAL AND RE-ERADICATION WORK.

A.- Individual Cooperation In Ribes Eradication In New England
And New York During 1929.

State	No. Cooperators		% of Total No. Cooperators (Wild Ribes Eradication) In Northeastern States Obtained In Each State.	Total Cost to Individuals	% of Total Cost to Individuals in Northeastern States Shared by Co-operators in Each State
	Wild & Cult. Ribes Erad.	Cult. Ribes Erad. Only			
Maine	1111	35	33.1	\$8261.32	16.4
N.H.	30	-	0.9	2814.79	5.6
Vt.	126	4	3.7	5791.94	11.5
Mass.	965	844	28.8	10183.69	20.2
Conn.	16	133	0.5	326.75	0.6
N.Y.	1105	-	33.0	23070.80	45.7
Totals	3353	1016	100.0	50449.29	100.0

Results Of Individual Cooperation In Ribes Eradication Work,
With And Without State Supervision, In New England and New York
During 1929.

Initial And Re-Eradication Work

State		Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	Totals
Coop. Erad.	Cult. Ribes Only	35	-	4	844	133	-	1,016
	Wild and Cult. Ribes	1,111	30	126	965	16	1,105	3,353
Acreage Examined		25,363	11,271	13,100	118,631	7,316	106,471	282,152
Wild Ribes Pulled		1,893,918	125,875	107,591	677,269	7,428	1,481,393	4,293,474
Cult. Ribes Pulled		17,816	430	233	14,948	1,866	4,923	40,216
Cost	State	0	\$504.86	\$574.13	\$7816.95	\$972.42	26,295.88	36,164.24
	Federal	-	-	-	-	100.00	-	100.00
	Towns	6983.13	0	27.00	0	0	0	7010.13
	Individuals	8261.32	2814.79	5791.94	10183.69	*252.25	23,070.80	50374.79
	TOTAL	15244.45	3319.65	6393.07	18000.64	1324.67	49,366.68	93649.16
Cost per acre		.601	.295	.488	.152	.181	.464	.332
Ribes per acre		74.7	11.2	8.2	5.7	1.0	13.9	15.2

*In addition, \$74.50 individual money was expended in connection with the state scouting work in Connecticut.

The federal expenditure in Connecticut was for the time spent by the temporary agents on control work performed in cooperation with individuals.

The Connecticut figures include 1182 wild Ribes and 1814 cultivated bushes eradicated from 5960 acres in connection with the nursery sanitation project; the state paying \$677.07, cooperating nurserymen \$80.25, and the Government \$15.00. As this is really "individual cooperation", it was included in the eradication summaries.

Of the total number of individual cooperators (3353) who eradicated wild Ribes in New England and New York during 1929, 95% were in the three states of Maine, Massachusetts, and New York. Of the total acreage worked on this basis, 42% was in Massachusetts, and 38% in New York. The expenditures by individual

owners in New York represented 45.8% of the total amount spent by all such cooperators during 1929.

The total acreage worked in cooperation with individuals represents 30.7% of the total area cleared of Ribes in New England and New York during 1929.

The total cost of this cooperative work with individuals was shared on the following basis: Individuals, 53.8%; States 38.6%; Towns, 7.5%; and Government, 0.1%. The percent of the total cost of such work, in each state, paid by individual cooperators in the respective states is as follows: Maine, 54.2%; New Hampshire, 84.8%; Vermont, 90.6%; Massachusetts, 56.6%; Connecticut, 19.0%; and New York, 46.5%.

The percent of increase or decrease in amount of all individual cooperation during 1929 over 1928 is as follows:

Number cooperators eradicating cultivated Ribes only.....	+2.5%
Number cooperators eradicating wild and cultivated Ribes.....	-1.1%
Number acres eradicated.....	-12.8%
Number wild Ribes pulled.....	+6.6%
Number cultivated Ribes pulled.....	+8.4%
(States.....	+19.8%
(
(Federal.....	-58.3%
(
Cost (Towns.....	-13.3%
(
(Individuals.....	-7.9%
(
(Total.....	+0.4%
Cost per acre.....	+14.8%
Ribes per acre.....	+21.6%

B.- Town Cooperation In Ribes Eradication In New England
And New York During 1929.

(Initial And Re-Eradication Work)

State	No. Towns Approp.	% Total Number in Each State	Amount Town Funds Appropriated	% Total Funds Approp. In Each State	Amount Town Funds Expended	% Total Funds Used in Each State
Maine	55	35.3	\$9,485.27	23.0	\$9429.83	22.83
N. H.	95*	60.9	29,300.00*	70.8	29506.99	71.4
Vt.	1	0.6	100.00	0.2	27.00	.07
Conn.	5	3.2	2,499.96	6.0	2359.46	5.7
Totals	156	100.0	\$41,385.23	100.0	\$41,323.28	100.00

*In two additional towns (not appropriating in 1929) \$457.90 was available for control work from balances of 1928 appropriations.

The town money in Maine was used chiefly to pay the wages of town foremen who supervised the control work performed by individual owners. However, in four towns (Bar Harbor, Westbrook, Readfield, and Portland) such money was used to employ crews to eradicate Ribes from definite blocks irrespective of property lines. Likewise in New Hampshire and Connecticut, all the town funds were employed solely to conduct control work in specific units regardless of individual properties. The town appropriation money in New Hampshire was increased 20 percent by the state. The town funds in Connecticut were derived from two sources, town appropriations and individual subscriptions for town projects. During 1929, three Connecticut towns appropriated \$1003. for control work, and individuals in two of these towns subscribed an additional \$724.83 for the town projects. One additional town made available \$70.13 from a balance of the previous year's appropriation. Also, individuals in another town subscribed \$700. for the local project. Therefore, town appropriations in Connecticut totaled \$1073.13, while individual subscriptions amounted to \$1424.83. The expenditures from the town appropriations were \$974.63, and those from funds derived from individual subscriptions totaled \$1384.83. In addition to the town funds, the State of Connecticut expended \$1822.65 and the federal government \$817.55 on town projects. The federal money was used for Ribes scouting purposes.

The town funds in Vermont were used to pay excess labor charges of foremen supervising the work of individuals.

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Results Of Town Cooperation In Ribes Eradication During 1929
In New England

(Initial And Re-Eradication Work)

State		Maine	N. H.	Conn.	Totals
Acreage examined		4,790	240,578	14,898	260,266
Wild Ribes pulled		165,702	1,961,417	109,756	2,236,875
Cult. Ribes pulled		210	6,171	8,606	14,987
Cost	Towns	\$2,446.70	\$29,506.99	\$2,359.46	\$34,313.15
	State	-	7,576.63	1,822.65	9,399.28
	Federal	-	-	817.55	817.55
	Total	\$2,446.70	\$37,083.62	\$4,999.66	\$44,529.98
Cost per acre		.511	.154	.336	.171
Ribes per acre		34.6	8.2	7.4	8.6

The total acreage worked on the basis of town cooperation (260,266 acres) represents 28.3% of the total area cleared of Ribes in New England and New York during 1929. Of the total acreage worked in cooperation with towns, 92.4 percent was in New Hampshire.

The percent of increase or decrease in town work during 1929 over 1928 is as follows:

Acreage eradicated.....	+18.9%
Wild Ribes pulled.....	+13.4%
Cultivated Ribes pulled.....	+149.2%
(Towns.....)	+10.9%
Cost (States.....)	+16.9%
(Total.....)	+14.2%
Cost per acre.....	-3.9%
Ribes per acre.....	-5.5%

C.- Eradication Of Ribes By States On Individuals' Lands In
New England And New York During 1929.

(Initial And Re-Eradication Work)

State		Maine	Mass.	Conn.	Totals
Acreage examined		203,390	122,927	12,000	338,317
Wild Ribes pulled		30,720	78,339	16,365	125,424
Cult. Ribes pulled		218	13,617	450	14,285
Cost	State	\$2,002.10	\$8,467.92	\$1,064.90	\$11,534.92
	Individuals	-	-	74.50	74.50
	Gov't.	1,265.73	-	510.83	1,776.56
	Total	\$3,267.83	\$8,467.92	\$1,650.23	\$13,385.98
Cost per acre		.016	.069	.138	.040
Ribes per acre		0.2	.6	1.4	0.4

The total acreage of such non-cooperative state work on private lands (338,317 acres) represents 36.8% of the total area cleared of Ribes in New England and New York during 1929. In Maine, 87.1% of the area cleared of Ribes was worked on this basis, while in Massachusetts and Connecticut, it amounted to 47.5% and 34.7%, respectively. This type of work in Connecticut was performed by three temporary agents employed in place of one permanent agent in the eastern district of the state.

The Maine data includes state law jobs, totaling 70 acres, which were eradicated of 13,914 wild Ribes at a cost of \$27.93. It was only necessary to enforce this state regulatory measure in three instances (all in one town) during 1929. The state did the eradication work and charged the cost to the town, which will reimburse the state. The town in turn will collect in taxes from the individuals.

In Massachusetts, the state paid all costs of such control work, while in Maine, the Government paid 38.7% of the scouting costs. The federal expenditure in Connecticut represents the cost of the three temporary agents while on federal pay. Individual funds to the amount of \$74.50 were used on the scouting work in Connecticut during 1929.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY

NAME	DATE	TIME	PLACE
John Doe	1920	10:00	Room 101
Jane Smith	1920	11:00	Room 102
Robert Brown	1920	12:00	Room 103
Emily White	1920	1:00	Room 104
William Black	1920	2:00	Room 105
Elizabeth Green	1920	3:00	Room 106
James Grey	1920	4:00	Room 107
Mary Hall	1920	5:00	Room 108
Charles King	1920	6:00	Room 109
Anna Lee	1920	7:00	Room 110

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
RECORDS OF THE DEPARTMENT OF CHEMISTRY
FROM 1920 TO 1921
The records of the Department of Chemistry from 1920 to 1921 are as follows:
1. The records of the Department of Chemistry from 1920 to 1921 are as follows:
2. The records of the Department of Chemistry from 1920 to 1921 are as follows:
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8. The records of the Department of Chemistry from 1920 to 1921 are as follows:
9. The records of the Department of Chemistry from 1920 to 1921 are as follows:
10. The records of the Department of Chemistry from 1920 to 1921 are as follows:

The percent of increase or decrease in 1929 over similar non-cooperative Ribes eradication work on private lands in 1928 is as follows:

Acreage eradicated.....	+6.2%
Wild Ribes pulled.....	+53.4%
Cultivated Ribes pulled.....	+32.7%
(State.....	-.064%
Cost (Gov't.....	-.303%
(Total.....	-.107%
Cost per acre.....	-.167%
Ribes per acre.....	+.667%

D.- Ribes Eradication Work On Public Lands In New England
And New York During 1929.

(Initial And Re-Eradication Work)

State	N. H.	Vt.	Mass.	Conn.	N.Y.	Totals
Acreage examined	295	200	16,857	383	21,285	39,020
Wild Ribes pulled	15,707	3,080	85,431	858	501,278	606,354
Cult. Ribes pulled	43	220	3,081	0	1,822	5,166
Total Cost	206.13	102.40	3,261.17	59.98	16099.80	19,729.48
Cost per acre	.699	.512	.193	.157	.756	.506
Ribes per acre	53.2	15.4	5.1	2.2	23.6	15.5

The total acreage (39,020 acres) eradicated on public lands represents 4.2% of the total area cleared of Ribes in New England and New York during 1929. It does not include the special federal control project at the Acadia National Park in Maine.

The blister rust agents supervised all the control work performed on state lands during 1929. In Massachusetts, the work was done in cooperation with five state departments, \$1,947.47 being expended by these agencies and \$1,313.70 from the regular state appropriation for blister rust control. Ribes eradication on state forests

in New York was conducted in all districts except those of Strait, Codman, R. Faige, Holcomb, and Richmond. It is gratifying to note the cost of this control work in New York during 1929 was 75 cents per acre compared with 85 cents in 1928 and \$1.97 in 1927.

The percent of increase or decrease in 1929 over similar state land work in 1928 is as follows:

Acreage eradicated.....	+104.4%
Wild Ribes destroyed.....	+ 1.0%
Cult Ribes destroyed.....	+ 19.0%
Total Cost.....	+ 83.5%
Cost per acre.....	- 10.1%
Ribes per acre.....	- 50.6%

II. INITIAL CONTROL WORK.Summary Of Total Initial Ribes Eradication Work In New England
And New York During 1929.

State	Acreage Initially Examined	Ribes Pulled		Total Cost	Per Acre Values	
		Wild	Cult.		Cost	Ribes
Maine	233,311	2,055,569	18,244	\$20,724.38	\$.089	8.8
N. H.	155,719	1,866,554	6,178	30,961.38	.198	12.0
Vt.	10,295	87,685	397	5,245.87	.510	8.5
Mass.	242,079	824,866	31,639	27,989.96	.116	3.4
R. I.	-	-	-	-	-	-
Conn.	28,394	127,124	9,471	7,128.74	.251	4.5
N. Y.	118,465	1,904,238	6,077	58,923.31	.497	16.1
Total	788,263	6,866,236	72,006	150,973.64	.192	8.7

The total acreage initially cleared of Ribes (788,263 acres) represents 85.7% of all eradication work conducted in New England and New York during 1929.

A.- Initial Ribes Eradication In Cooperation With Individuals
In New England And New York During 1929.

State		Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	Totals
Coop. Erad.	Cult.Ribes Only	35	-	4	844	112	-	995
	Wild and Cult.Ribes	1,092	16	112	912	3	1,070	3,205
Acres examined initially		25,131	4,554	10,095	103,005	1,586	100,852	245,223
Wild Ribes pulled		1,859,147	90,901	84,805	664,712	3,673	1,421,113	4,124,351
Cult.Ribes pulled		17,816	119	177	14,941	415	4,772	38,240
Cost	State	-	333.64	544.63	7,564.56	358.34	24,767.03	33,293.87
	Towns	6843.73	-	27.00	-	-	-	6,870.73
	Individuals	8166.12	1334.66	4571.84	8,768.69	139.25	21,247.32	44,227.66
	Gov't.	-	-	-	-	25.00	-	25.00
	Total	15009.85	1668.30	5143.47	16,333.25	522.59	46,014.35	84,691.81
Cost per acre		.600	.366	.510	.159	.330	.456	.345
Ribes per acre		74.0	19.9	8.4	6.5	2.3	14.1	16.8

The initial eradication work conducted in cooperation with individuals (245,223 acres) represents 31.1% of all initial control work performed in New England and New York during 1929. Of the total acreage initially worked in cooperation with individuals, 42.0% was in Massachusetts and 41.1% in New York. However, individual cooperators in New York contributed 48.0% of the total amount of private funds used in all states on this type of work.

B.- Town Cooperation In Initial Ribes Eradication In New England and New York During 1929.

State	No. Towns Approp.	% Total No. in Each State	Amount Town Money Expended	% Total Funds Expended in Each State
Maine	54	38.8	\$9,290.43	26.5
N. H.	80	57.6	23,362.28	66.7
Vt.	1	0.7	27.00	0.1
Conn.	4	2.9	2,330.47	6.7
Totals	139	100.0	\$35,010.18	100.0

Twelve of the towns listed above (9 in New Hampshire and 3 in Maine) also appropriated for re-eradication work.

The town funds in Maine were used chiefly to pay the wages of town foremen, who supervised the control work done by individuals. However, in four towns such money was used to employ crews to eradicate Ribes from definite blocks irrespective of property lines. Likewise in New Hampshire and Connecticut, all the town funds were employed solely to conduct control work in specific areas. The State of New Hampshire increased the amount of town money by twenty percent, and in Connecticut \$1,807.90 state money and \$817.55 federal funds were used on town projects. The small amount of town funds in Vermont (\$27.00) paid excess labor charges of foremen supervising the work of individuals.

Results Of Town Cooperation In Initial Ribes Eradication
In New England And New York During 1929.

State		Maine	N. H.	Conn.	Totals
Acreage examined		4,790	151,050	14,608	170,648
Wild Ribes pulled		165,702	1,775,624	107,086	2,048,412
Cult. Ribes pulled		210	6,059	8,606	14,875
Cost	Towns	\$2,446.70	\$23,362.28	\$2,330.47	\$28,139.45
	State	-	5,914.24	1,807.90	7,722.14
	Gov't.	-	-	817.55	817.55
	Total	\$2,446.70	\$29,276.52	\$4,955.92	\$36,679.14
Cost per acre		.511	.193	.335	.215
Ribes per acre		34.6	11.7	7.2	12.0

The total acreage initially cleared of Ribes in cooperation with towns (170,648 acres) comprises 21.7% of the total initial work completed in New England and New York during 1929. Eighty-eight percent of this acreage initially eradicated of Ribes in cooperation with towns was in New Hampshire.

C.- Initial Eradication Work By States On Individuals' Lands
In New England And New York During 1929.

State		Maine	Mass.	Conn.	Totals
Acreage Examined		203,390	122,217	12,000	337,607
Wild Ribes Pulled		30,720	74,723	16,365	121,808
Cult. Ribes pulled		213	13,617	450	14,285
Cost	State	\$2,002.10	\$8,395.54	\$1,064.90	\$11,462.54
	Individuals	-	-	74.50	74.50
	Gov't.	1,265.73	-	510.83	1,776.56
	Total	\$3,267.83	\$8,395.54	\$1,650.23	\$13,313.60
Cost per acre		\$.016	\$.069	\$.175	\$.039
Ribes per acre		0.2	0.6	1.4	0.4

The acreage worked on this basis (337,607 acres) represents 42.8% of the total acreage initially cleared of Ribes in New England and New York during 1929.

D.- Initial Ribes Eradication Work On Public Lands In New
England And New York During 1929.

State	N. H.	Vt.	Mass.	N. Y.	Totals
Acreage Examined	115	200	16,857	17,613	34,785
Wild Ribes Pulled	29	3,080	85,431	483,125	571,665
Cult. Ribes Pulled	-	220	3,081	1,305	4,606
Total Cost	\$16.56	\$102.40	\$3,261.17	\$12,908.96	\$16,289.09
Cost per acre	\$.143	\$.512	\$.193	\$.733	\$.468
Ribes per acre	0.25	15.4	5.1	27.4	16.4

The initial eradication work on public lands (34,785 acres) represents 4.4% of the total acreage initially cleared of Ribes in New England and New York during 1929.

III. RE-ERADICATION WORK

Summary of Total Ribes Re-Eradication Work in New England and New York During 1929.

State	Acreage Re-Examined	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Maine	232	34,771	0	\$234.60	\$1.01	149.9
N. H.	96,425	236,445	466	9,648.02	.10	2.5
Vt.	3,005	22,786	56	1,249.60	.41	7.6
Mass.	16,336	16,173	7	1,739.77	.106	0.9
Conn.	6,203	7,283	1,451	905.80	.146	1.2
N. Y.	9,291	78,433	668	6,543.17	.704	8.4
Totals	131,492	395,891	2,648	\$20,320.96	.154	3.0

The total acreage re-worked (131,492 acres) represents 14.3% of all cooperative eradication work conducted in New England and New York during 1929. Of this total area re-examined, 73.3% was in New Hampshire, where 38.2% of the control work was re-eradication. The acreage re-eradicated of Ribes in Maine amounted to only 0.1% of all the work done in that state, while in Vermont, Connecticut, New York, and Massachusetts, the percentages were 22.6%, 17.9%, 7.3%, and 6.3%, respectively.

The four different classes of re-eradication work are summarized on pages 40 to 42.

A.- Ribes Re-Eradication In Cooperation With Individuals
In New England And New York During 1929.

State		Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	Totals
Coop. Erad.	Cult. Ribes Only	0	0	0	0	21	0	21
	Wild and Cult. Ribes	19	15*	14	53	13	35	149*
Acreage Re-examined		232	6,717	3,005	15,626	5,730	5,619	36,929
Wild Ribes destroyed		34,771	34,974	22,786	12,557	3,755	60,280	169,123
Cult. Ribes destroyed		0	311	56	7	1,451	151	1,976
Total Cost	State	0	\$171.22	\$29.50	\$252.39	\$614.08	\$1528.85	\$2596.04
	Towns	\$139.40	0	0	0	0	0	139.40
	Individuals	95.20	1480.13	1220.10	1415.00	113.00	1823.48	6146.91
	Federal	0	0	0	0	75.00	0	75.00
	Total	\$234.60	\$1651.35	\$1249.60	\$1667.39	\$802.08	\$3352.33	\$8957.35
Cost per acre		\$1.01	\$.246	\$.416	\$.107	\$.14	\$.597	\$.243
Ribes per acre		149.9	5.2	7.6	0.8	0.7	10.7	4.6

The re-eradication work conducted in cooperation with individuals (36,929 acres) represents 28.1% of the total area re-examined in New England and New York during 1929, and 13.1% of all the work (initial and re-eradication) done in cooperation with individuals. As in the preceding tables on individual cooperation, this summary includes both the work done with and without direct state supervision.

*Includes one individual, who also cooperated in initial control work.

B.- Town Cooperation In Ribes Re-Eradication In New England
And New York During 1929.

State	No. Towns Approp.	% Total Number In Each State	Amount Town Money Expended	% Total Funds Ex- pended in Each State
Maine	3*	10.0	\$139.40	2.2
N. H.	26**	86.7	6144.71	97.3
Conn.	1	3.3	28.99	0.5
Totals	30	100.0	\$6313.10	100.0

The town funds in Maine were used to pay the wages of town foremen who supervised the work done by individuals; while in New Hampshire and Connecticut, the town money was turned over to the State and used to eradicate Ribes from definite blocks regardless of property lines. In New Hampshire, \$1662.39 state money was added to the town funds, and \$14.75 additional state money was used in Connecticut on town re-eradication projects.

*These three towns also appropriated for initial eradication work.

**Includes nine towns which also appropriated for initial control work.

Results Of Town Cooperation In Re-Eradication Of Ribes
In New England And New York During 1929.

State		N. H.	Conn.	Totals
Acreage re-examined		89,528	90	89,618
Wild Ribes destroyed		185,793	2,670	188,463
Cult. Ribes destroyed		112	0	112
Cost	Towns	\$6,144.71	\$28.99	\$6,173.70
	State	1,662.39	14.75	1,677.14
	Total	\$7,807.10	\$43.74	\$7,850.84
Cost per acre		\$.087	\$.486	\$.088
Ribes per acre		2.1	29.7	2.1

The total acreage re-eradicated of Ribes in cooperation with towns represents 68.1% of all re-worked area during 1929. Of the total acreage re-examined on the basis of town cooperation, over 99 percent is in New Hampshire.

C.- Re-Eradication Work By State On Individuals' Lands
In New England And New York During 1929.

Massachusetts was the only state which conducted any re-eradication on this basis during 1929; 3,616 wild Ribes being pulled from 710 acres re-examined by state scouts at a total cost of \$72.38. This work represents 0.6% of the total area re-worked in New England and New York during 1929.

D.- Ribes Re-Eradication Work On Public Lands In New
England And New York During 1929.

State	Acreage Re-examined	Ribes Pulled		Total Cost	Per Acre Values	
		Wild.	Cult.		Cost	Ribes
N. H.	180	15,678	43	\$189.57	\$1.053	87.1
Conn.	383	858	0	59.98	.157	22.4
N. Y.	3,672	18,153	517	3,190.84	.869	4.9
Totals	4,235	34,689	560	3,440.39	.812	8.2

This re-eradication work on public lands (4,235 acres) represents 3.2% of the total area re-examined in New England and New York during 1929. All costs were paid by the respective states.

$$\frac{1}{2} \left(\frac{1}{n} + \frac{1}{m} \right) = \frac{1}{2} \left(\frac{1}{10} + \frac{1}{10} \right) = \frac{1}{10}$$

Find the sum of the first 10 terms of the arithmetic progression.

Given: $a = 1$, $d = 1$, $n = 10$

Sum of first n terms of an arithmetic progression is given by

$$S_n = \frac{n}{2} [2a + (n-1)d]$$

$$S_{10} = \frac{10}{2} [2 \times 1 + (10-1) \times 1]$$

		Sum of first n terms		Sum of first n terms	
n	S_n	n	S_n	n	S_n
1	1	11	66	21	231
2	3	12	78	22	253
3	6	13	91	23	276
4	10	14	105	24	300
5	15	15	120	25	325
6	21	16	136	26	351
7	28	17	153	27	378
8	36	18	171	28	406
9	45	19	190	29	435
10	55	20	210	30	465

Sum of first 10 terms of the arithmetic progression is 55.

Sum of first 10 terms of the arithmetic progression is 55.

Sum of first 10 terms of the arithmetic progression is 55.

STATE COMPENSATION FOR CULTIVATED RIBES DESTROYED IN
NEW ENGLAND AND NEW YORK DURING 1929.

State	Total No. Cult. Ribes Destroyed	No. Bushes For Which Compensation Was Paid	% Total Bushes Paid For	No. Persons Paid Com- pensation	Amount Paid	Average Per Bush Compensa- tion
Maine	18,244	0	0	0	0	-
N. H.	6,644	50	0.8	2	\$3.71	\$.07
Vt.	453	62	13.7	4	27.00	.44
Mass.	32,881**	2,381*	7.2	77*	1009.10*	0.42
R. I.	6,609**	0	0	0	0	-
Conn.	10,922	61	0.6	4	27.25	.45
N. Y.	11,115**	756	6.8	376	378.75	.51
Totals 1929	86,868	3,310	3.8	463	\$1445.81	.44
Totals 1928	69,825	3,245	4.6	181	1279.04	.39
Totals 1927	50,817	4,544	8.9	143	1731.96	.38

*Claims received, but not settled.

**The Massachusetts, Rhode Island, and New York figures for 1929 include cultivated Ribes pulled in connection with special black currant eradication or nursery sanitation projects. These are not included in the regular Ribes eradication summaries in this report. The 1927 and 1928 total figures for cultivated Ribes destroyed also include bushes pulled on special projects.

The amount listed for compensation in Massachusetts represents claims made by owners for bushes destroyed during 1929, but such claims will not be settled until the spring of 1930.

CLASSIFICATION OF COOPERATIVE BLISTER RUST CONTROL FUNDS USED ON "RIBES
ERADICATION" IN NEW ENGLAND AND NEW YORK DURING 1929.

Expenditures	Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	Totals
Individuals	\$3201.32	\$2814.79	\$5791.94	\$10183.69	\$326.75	\$23070.60	\$50449.29
Towns	9429.83	29506.99	27.00	0	2359.45	0	41323.28
State Approp.	2002.10	6287.62	670.53	17598.57	3359.97	42395.68	74820.47
All Other State Funds	0	0	0	1947.47	59.98	0	2007.45
Federal Funds	1265.73	0	0	0	1428.38	0	2694.11
TOTAL	\$20,958.98	\$40,609.40	\$6,495.47	\$29,729.73	\$8,034.54	\$65,466.48	\$171,294.60

1. The funds spent on the Ribes eradication project were for laborers, scouts, and foremen. The cost of state checkers in New Hampshire and the eradication assistants in New York was not included in this project.

2. The total cost of "Ribes Eradication" (\$171,294.60) represents 48.4% of all state and federal expenditures on all blister rust control projects in New England and New York during 1929, compared with \$158,006.73 and a percentage figure of 44.6% in 1928.

3. Proportion paid by the various cooperators during 1928 and 1929 on the project - "Ribes Eradication" in New England and New York.

Source of Funds	Amount Expended 1929	Amount Expended 1928	% + or - 1929 over 1928	Percent of Total Amount Spent by Each Cooperating Class	
				1929	1928
Individuals	\$50,449.29	\$54,667.68	-7.7	29.5	34.6
Towns	41,323.28	39,038.73	+5.9	24.1	24.7
State Approp.	74,820.47	60,301.01	+24.1	43.7	36.2
Other State Funds	2,007.45	627.19	+220.1	1.2	0.4
Gov't. (Scouting)	2,694.11	3,311.52	-18.6	1.5	2.1
TOTAL	\$171,294.60	\$158,006.73	+8.4	100.0	100.0

4. Percent of total amount of money used, in each state, by all cooperators on Ribes eradication project, expended by individuals in New England and New York.

Year	Maine	N. H.	Vt.	Mass.	Conn.	N. Y.	Totals
1929	39.4	6.9	89.2	34.3	4.1	35.2	29.5
1928	42.3	11.1	84.6	35.7	24.3	46.2	34.6

4 (a). Comparison of the percentage of the cost to individuals, in each state, to the total cost to individuals in New England and New York for the project - "Ribes Eradication" during 1928 and 1929.

Year	Maine	N. H.	Vt.	Mass.	Conn.	N. Y.	Totals
1929	16.4	5.6	11.5	20.2	0.6	45.7	100.0
1928	17.5	8.3	10.6	17.3	3.6	42.7	100.00

5. Percent of total amount of money used in each state by all cooperators on "Ribes Eradication", expended from town funds.

Year	Maine	N. H.	Vt.	Conn.	Totals
1929	45.0	72.7	0.4	29.4	24.1
1928	44.3	67.1	1.6	19.1	24.7

THE UNIVERSITY OF CHICAGO
DIVISION OF THE PHYSICAL SCIENCES
DEPARTMENT OF CHEMISTRY
CHICAGO, ILLINOIS 60637

TO THE EDITOR:
I am writing to you regarding the
results of the experiment conducted
on the reaction of the
catalyst with the substrate.

The data obtained from the
experiment are as follows:
The reaction rate was found to be
proportional to the concentration of the
catalyst.

The following table shows the
results of the experiment:
The reaction rate was found to be
proportional to the concentration of the
catalyst.

The results of the experiment
are as follows:
The reaction rate was found to be
proportional to the concentration of the
catalyst.

The following table shows the
results of the experiment:
The reaction rate was found to be
proportional to the concentration of the
catalyst.

6. Percent of total funds used on "Ribes Eradication" project by all cooperators, in each state, expended from state appropriations in New England and New York:

Year	Maine	N. H.	Vt.	Mass.	Conn.	N. Y.	Totals
1929	9.5	20.4	10.4	59.2	48.0	64.8	43.7
1928	8.0	21.8	13.8	62.6	28.4	53.8	38.2

6-(a). Percent of total state blister rust appropriation used on project - "Ribes Eradication" in each of the New England States and New York:

Year	Maine	N. H.	Vt.	Mass.	Conn.	N. Y.	Totals
1929	31.5	47.4	43.6	92.7	48.1	53.9	55.7
1928	29.3	46.6	40.9	89.1	39.8	39.1	48.5

7. The expenditure under the heading "All Other State Funds" was for cooperative eradication work on state lands by other state departments in Massachusetts and the State Forestry Department in Connecticut. This expenditure of \$2,007.45 represents 1.2% of the total amount of money spent by all cooperators on "Ribes Eradication" in New England and New York during 1929. The Massachusetts expenditure of \$1,947.47 was 6.5% of the total funds used on Ribes eradication in that state, while the money expended in Connecticut from this source (\$59.98) amounted to 0.7% of the total cost of "Ribes Eradication" in that state.

8. The federal expenditure of \$2,694.11 was for Ribes scouting performed by temporary agents in Maine and Connecticut. This federal expenditure represents 1.5% of the entire costs of "Ribes Eradication" in New England and New York during 1929.

ANNUAL STATISTICAL REPORT OF COOPERATIVE BLISTER RUST CONTROL WORK

STATE: NEW JERSEY AND NEW YORK

PERIOD: Calendar Year 1929

DISTRICTS		PERIOD							TOTALS FOR ALL STATES
STATES	AGENTS' NAMES	VA.	N.H.	VT.	MASS.	CONN.	N.Y.		
MODE OF SERVICE THIS YEAR									
INDIVIDUAL COOPERATION	NO COOP WILD ERAD.	35	—	4	844	112		995	
	CULT. RIBES ONLY	1,092	16	112	912	3	1070	3205	
	WILD AND CULT. RIBES								
	ACREAGE ERAD.	25,131	4554	10,095	103,005	1586	100852	245223	
	WILD RIBES PULLED	1,859,147	90,901	84,805	664,712	3673	1,421,113	4,124,351	
	CULT. RIBES PULLED	17,816	119	177	14,941	415	4772	38,240	
	STATE	0	333.64	544.63	7564.56	358.34	25041.36	33,293.87	
	TOWNS	6843.73	—	27.00	—	Fed. 25.00	—	6870.73	
	INDIVIDUALS	8166.12	1334.66	4571.84	8768.69	139.25	21,247.32	44,227.88	
	TOTAL	15009.85	1668.30	5143.47	16333.25	522.59	46,014.35	84,691.81	
COST PER ACRE		.600	.366	.510	.159	.330	.456	.345	
RIBES PER ACRE		74.0	19.9	8.4	6.5	2.3	14.1	16.8	
TOWN COOPERATION	TOWN NUMBER	54	80	1		4		139	
	APPROX. AMOUNT EXPENDED	9290.43	23362.28	27.00		2330.47		35,010.18	
	ACREAGE ERAD.	4790	161,050			14,808		170,648	
	WILD RIBES PULLED	165,702	1,775,621			107,086		2,048,412	
	CULT. RIBES PULLED	210	6,059			8,606		14,875	
	TOWNS	2446.70	23,362.28			2,330.47		28,139.45	
	STATE	—	5,914.24			1,807.90		7,722.14	
	TOTAL	2446.70	29,276.52			4,138.37		36,679.14	
	COST PER ACRE	.511	.193			.335		.215	
	RIBES PER ACRE	34.6	11.7			7.2		12.0	
STATE WORK ON INDIVIDUALS' LANDS	ACREAGE ERAD.	70	203320		122,217	12000		337,607	
	WILD RIBES PULLED	13914	16806		74,723	16365		121,808	
	CULT. RIBES PULLED	0	218		13,617	450		14,285	
	COST TO STATE	2793	1974.17		8395.54	1064.90		11,462.54	
	" " GOVT		1265.73			Fed. 510.83		1776.56	
	TOTAL COST	2793	3239.90		8395.54	Individ. 74.50		Individ. 74.50	
	COST PER ACRE		.016		.069	TOTAL 1650.23		TOTAL 13,313.60	
	RIBES PER ACRE		0.2		0.6	.175		.039	
	ACREAGE ERAD.		115	200	16,857		17613	34,785	
	WILD RIBES PULLED		29	3080	85,431		483,175	571,665	
PUBLIC LANDS	CULT. RIBES PULLED		—	220	3,081		1,305	4,606	
	TOTAL COST		16.56	102.40	3261.17		12,908.96	16,289.09	
	COST PER ACRE		.143	.512	.193		.733	.468	
	RIBES PER ACRE		0.25	15.4	5.1		27.4	16.4	
	ACREAGE ERAD.	233,311	155,719	10,295	242,079	28,394	118,465	788,263	
	WILD RIBES PULLED	2,055,569	1,866,554	87,885	824,866	127,124	1,904,238	6,866,236	
	CULT. RIBES PULLED	18,244	6,178	397	31,369	9,471	6077	72,006	
	INDIVIDUALS	8166.12	1334.66	4571.84	8768.69	213.75	21247.32	44,302.38	
	TOWNS	9290.43	23,362.28	27.00	—	2330.47		35,010.18	
	STATE	2002.10	6264.44	647.03	19,221.27	3231.14	37,675.99	69,041.97	
GRAND TOTALS (ALL ERADICATION WORK)	TOTAL	1265.73	—	—	—	1353.38		2,619.11	
	TOTAL	20,724.38	30961.38	5245.87	27,989.96	7128.74	58923.31	150,973.64	
	COST PER ACRE	.089	.198	.510	.116	.251	.497	.192	
	RIBES PER ACRE	8.8	12.0	8.5	3.4	4.5	16.1	8.7	
	RIBES COMPENSATION								
	No. PERSONS PAID								
	No. BUSHES								
	AMOUNT PAID								
	No. ACRES NON-PINE LAND ELIMINATED								

ANNUAL STATISTICAL REPORT OF COOPERATIVE BLISTER RUST CONTROL WORK

STATE: NEW HAMPSHIRE AND NEW YORK. (RE-ERADICATION WORK)PERIOD: Calendar Year 1929

DISTRICTS										TOTALS FOR ALL STATES
STATES AGENTS' NAMES		Maine	N.H.	Vt.	Mass.	Conn.	N.Y.			
METHOD OF SERVICE THIS YEAR										
INDIVIDUAL COOPERATION	NO. COOP. WHO. ERAD.									
	CULT. RIBES ONLY	0	0	0	0	21	0			21
	WILD AND CULT. RIBES	19	15*	14	53	13	35			149*
	ACREAGE ERAD.	232	6717	3005	15626	5730	5619			36929
	WILD RIBES PULLED	34771	34974	22786	12557	3755	60280			169123
	CULT. RIBES PULLED	0	311	56	7	1451	151			1976
	TOTAL									
	STATE	0	171.22	29.50	252.39	614.08	1528.85			2596.04
	TOWNS	139.40	0	0	0	0	0			139.40
	INDIVIDUALS	95.20	1480.13	1220.10	1415.00	113.00	1823.48			6146.91
TOWN COOPERATION	TOTAL	23460	1651.35	1249.60	1667.39	802.08	3352.33			8957.35
	COST PER ACRE	1.01	.246	.416	.107	.14	.597			.243
	RIBES PER ACRE	149.9	5.2	7.6	0.8	0.7	10.7			4.6
	TOWN NUMBER	3***	26**			1				30
	APPROX. AMOUNT EXPENDED	139.40	6144.71			28.99				6313.10
	ACREAGE ERAD.		89528			90				89618
	WILD RIBES PULLED		185793			2670				188463
	CULT. RIBES PULLED		112			0				112
	TOTAL		6144.71			28.99				6173.70
	COST		1662.39			14.75				1677.14
RIBES ERADICATION	TOTAL		7807.10			43.74				7850.84
	COST PER ACRE		.087			.486				.088
	RIBES PER ACRE		2.1			29.7				2.0
	ACREAGE ERAD.				710					710
	WILD RIBES PULLED				3616					3616
	CULT. RIBES PULLED				0					0
	COST TO STATE				72.38					72.38
	COST PER ACRE				.102					.102
	RIBES PER ACRE				5.1					5.1
	ACREAGE ERAD.		180			383	3672			4235
STATE WORK ON LANDS	WILD RIBES PULLED		15678			858	18153			34689
	CULT. RIBES PULLED		43			0	517			560
	TOTAL COST		189.57			59.98	3190.84			3440.39
	COST PER ACRE		1.053			.157	.869			.812
	RIBES PER ACRE		87.1			22.4	4.9			8.2
	ACREAGE ERAD.	232	96425	3005	16336	6203	9291			131492
	WILD RIBES PULLED	34771	236445	22786	16173	7283	78433			395891
	CULT. RIBES PULLED	0	466	56	7	1451	668			2648
	INDIVIDUALS	95.20	1480.13	1220.10	1415.00	113.00	1823.48			6146.91
	TOTAL	139.40	6144.71	0	0	28.99	0			6313.10
PUBLIC LANDS	COST	0	2023.18	29.50	324.77	688.81	4719.69			7785.95
	FED.	0	0	0	0	75.00	0			75.00
	TOTAL	234.60	9648.02	1249.60	1739.77	905.80	6543.17			20320.96
	COST PER ACRE	\$1.01	.10	.416	.106	.146	.704			.154
	RIBES PER ACRE	149.9	2.5	7.6	0.9	1.2	8.4			3.0
	ACREAGE ERAD.									
	WILD RIBES PULLED									
	CULT. RIBES PULLED									
	INDIVIDUALS									
	TOTAL									
GRAND TOTALS	COST									
	FED.									
	TOTAL									
	COST PER ACRE									
	RIBES PER ACRE									
	ACREAGE ERAD.									
	WILD RIBES PULLED									
	CULT. RIBES PULLED									
	INDIVIDUALS									
	TOTAL									
RIBES COMPENSATION	NO. PERSONS PAID									
	NO. BUSHES									
	AMOUNT PAID									
	NO. ACRES NON-PINE LAND ELIMINATED									
	NO. PERSONS PAID									
	NO. BUSHES									
	AMOUNT PAID									
	NO. ACRES NON-PINE LAND ELIMINATED									
	NO. PERSONS PAID									
	NO. BUSHES									
	AMOUNT PAID									

*Includes 1 individual who also approved for initial control work.

**Includes 4 towns which also approved for initial control work.

***Also appropriated for initial control work.

ANNUAL STATISTICAL REPORT OF COOPERATIVE BLISTER RUST CONTROL WORK

STATE: NORTH EASTERN STATES

PERIOD: 1954.

DISTRICTS										TOTALS FOR STATE
AGENTS' NAMES		Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	New England and New York		
KIND OF SERVICE THIS YEAR										
INDIVIDUAL COOPERATION	NO COOP. WMC ERAD.	35	—	4	844	133	—	1016		
	CULT. RIBES ONLY	1111	30	126	965	16	1105	3353		
	WILD AND CULT. RIBES	25,363	11,271	13,100	118,631	7316	106,471	282,152		
	ACREAGE ERAD.	1,893,918	125,875	107,591	677,269	7428	1,481,393	4,293,474		
	WILD RIBES PULLED	17,816	430	233	14,948	1866	4,923	40,216		
	CULT. RIBES PULLED	0	504.86	574.13	7816.95	972.42	26,295.88	36,164.24		
	TOTAL TOWNS	6983.13	0	27.00	0	Fed. 100.00	0	100.00 7010.13		
	INDIVIDUALS	8261.32	2814.79	5791.94	10,183.69	252.25	23,070.80	50,374.79		
	TOTAL	15,244.45	3319.65	6393.07	18,000.64	1324.67	49,366.68	93,649.16		
	COST PER ACRE	.601	.295	.488	.152	.181	.464	.332		
RIBES PER ACRE	74.7	11.2	82	5.7	1.0	13.9	15.2			
TOWN COOPERATION	TOWN NUMBER	55	* 95	1	0	5	0	* 156		
	APPROX. AMOUNT	4485.27	29300.00	102.00	0	2449.46	0	41385.22		
	ACREAGE ERAD.	4790	240,578			14,898		260,266		
	WILD RIBES PULLED	165,702	1,961,417			109,756		2,236,875		
	CULT. RIBES PULLED	210	6171			8,606		14,987		
	TOTAL TOWNS	2446.70	29,506.99			2359.46		34,313.15		
	STATE	—	7,576.63			1822.65 Fed.-817.55		9399.28 Fed.-817.55		
	TOTAL	2446.70	37,083.62			4999.66		44,529.98		
	COST PER ACRE	.511	.154			.336		.171		
	RIBES PER ACRE	34.6	8.2			7.4		8.6		
RIBES ERADICATION	ACREAGE ERAD.	70	203,320		122,927	12,000		338,317		
	WILD RIBES PULLED	13,914	16,806		78,339	16,365		125,424		
	CULT. RIBES PULLED	0	218		13,617	450		14,285		
	COST TO STATE	27.93	1974.17		8467.92	1064.90		11,534.92		
	" " GOV'T.	—	1265.73		—	510.83		1776.56		
	TOTAL COST	27.93	3239.90		8467.92	1575.73		13,385.98		
	COST PER ACRE		.016		.069	Total-1650.23 .138		.040		
	RIBES PER ACRE		0.2		0.6	1.4		0.4		
	ACREAGE ERAD.		295	200	16,857	383	21,285	39,020		
	WILD RIBES PULLED		15,707	3080	85,431	858	501,278	606,354		
CULT. RIBES PULLED		43	220	3081	0	1822	5,166			
TOTAL COST		216.13	102.40	3261.17	59.98	16,099.80	19,729.48			
COST PER ACRE		.699	.512	.193	.157	.756	.506			
RIBES PER ACRE		53.2	15.4	5.1	2.2	23.6	15.5			
STATE WORK ON LANDS	ACREAGE ERAD.	233,543	252,144	13,300	258,415	34597	127,756	919,755		
	WILD RIBES PULLED	2,090,340	2,102,999	110,671	841,039	134,407	1,982,671	7,262,127		
	CULT. RIBES PULLED	18,244	6,644	453	31,646	10,922	6745	74,654		
	INDIVIDUALS	8261.32	2814.79	5791.94	10,183.69	326.75	23,070.80	50,449.29		
	TOTAL TOWNS	9429.83	29,506.99	27.00	0	2359.46		41,323.28		
	STATE	2002.10	8287.62	676.53	19,546.04	3919.95	42,395.68	76,827.92		
	Gov't.	1265.73	0	0	0	1428.38		2694.11		
	TOTAL	20,958.98	40,609.40	6495.47	29,729.73	8034.54	65,466.48	171,294.60		
	COST PER ACRE	.090	.161	.488	.115	.232	.512	.186		
	RIBES PER ACRE	9.0	8.3	8.3	3.3	3.9	15.5	7.9		
GRAND TOTALS	ACREAGE ERAD.	233,543	252,144	13,300	258,415	34597	127,756	919,755		
	WILD RIBES PULLED	2,090,340	2,102,999	110,671	841,039	134,407	1,982,671	7,262,127		
	CULT. RIBES PULLED	18,244	6,644	453	31,646	10,922	6745	74,654		
	INDIVIDUALS	8261.32	2814.79	5791.94	10,183.69	326.75	23,070.80	50,449.29		
ALL ERADICATION WORK	TOTAL TOWNS	9429.83	29,506.99	27.00	0	2359.46		41,323.28		
	STATE	2002.10	8287.62	676.53	19,546.04	3919.95	42,395.68	76,827.92		
	Gov't.	1265.73	0	0	0	1428.38		2694.11		
	TOTAL	20,958.98	40,609.40	6495.47	29,729.73	8034.54	65,466.48	171,294.60		
RIBES COMPENSATION	COST PER ACRE	.090	.161	.488	.115	.232	.512	.186		
	RIBES PER ACRE	9.0	8.3	8.3	3.3	3.9	15.5	7.9		
	NO PERSONS PAID	0	2	4	77	4	376	463		
	NO BUSHES	0	50	62	2381	61	756	3310		
RIBES	AMOUNT PAID	0	3.71	\$27.00	1009.10	27.25	\$378.75	1445.81		
	NO. ACRES NON-PINE LAND ELIMINATED	* In two additional towns (not appropriating in 1929) \$457.90 was available for control work from balances of 1928 appropriations.								

SUMMARY OF COOPERATIVE RIBES ERADICATION WORK CONDUCTED IN
PENNSYLVANIA AND LAKE STATES DURING 1929.

(Initial and Re-eradication Work)

State		Pennsylvania	Michigan	Wisconsin	Total
Acreage eradicated		4,998	2,570	180	7,748
Wild Ribes destroyed		306,650	170,982	18,744	496,376
Cult. Ribes destroyed		553	391*	0	944
Cost	State	\$3,387.96	\$3,029.16	\$532.98	\$6,950.10
	Individuals	170.00	-	-	170.00
	Towns	-	199.50	-	199.50
	Gov't.	-	378.97	238.07	617.04
	Total	\$3,557.96	\$3,607.63	\$771.05	\$7,936.64
Cost per acre		\$.712	\$1.40	\$4.28	\$1.02
Ribes per acre		61.3	66.5	104.1	64.1

*An additional 5,194 cultivated Ribes were destroyed in connection with the black currant eradication project in Michigan, but such work is not included in the regular Ribes eradication summary.

Detailed information on the Ribes eradication work performed in these three states is given on pages 103, 107, 110, and 111.

SUMMARY OF FEDERAL RIBES ERADICATION PROJECTS ON PUBLIC LANDS
IN EASTERN STATES DURING 1929.

Location	Acreage Eradicated	Ribes Destroyed		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Allegheny National Forest	461	23,020	8	\$198.30	\$.430	49.9
Shenandoah National Forest	1,260	1,560	2	169.51	.135	1.2
Monongahela National Forest	414	3,108	73	143.53	.347	7.5
Acadia National Park	1,148	74,373	0	1,235.40	1.08	64.8
Total	3,283	102,061	83	\$1,746.74	\$.532	31.1

All this work was initial eradication conducted as strictly federal projects; the Office of Blister Rust Control furnishing supervision in each instance. Detailed reports have already been submitted for these federal control projects.

SUMMARY OF ALL RIBES ERADICATION WORK IN EASTERN
AND LAKE STATES DURING 1929.

(Initial and Re-eradication Work)

		Cooperative Work In New England and New York	Cooperative Work In Pennsylvania, Michigan, And Wisconsin	Federal Control Projects	Total All Eradi- cation Work
Acreage eradicated		919,755	7,748	3,283	930,786
Wild Ribes destroyed		7,262,127	496,376	102,061	7,860,564
Cult. Ribes destroyed		74,654	944	83	75,681
Cost	Towns	\$41,323.28	\$199.50	-	\$41,522.78
	Individuals	50,449.29	170.00	-	50,619.29
	State	76,827.92	6,950.10	-	83,778.02
	Federal	2,694.11	617.04	\$1,746.74	5,057.89
	Total	\$171,294.60	\$7,936.64	\$1,746.74	\$180,977.98
Cost per acre		\$.186	\$1.02	\$.532	\$.195
Ribes per acre		7.9	64.1	31.1	8.46

PERCENT OF TIME SPENT ON EACH ACTIVITY BY AVERAGE PERMANENT
AGENT IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Education		Personal Service		Supervision		Field Data		Scouting	Office (Routine)	Travel
	Office	Field	Office	Field	Office	Field	Office	Field			
Maine	0.3	7.3	0.04	12.56	1.0	19.2	0.6	3.5	2.7	27.4	25.4
N. H.	5.0	4.4	0.6	15.2	1.3	19.5	2.4	9.7	8.1	9.9	23.9
Vt.	2.1	6.2	0.9	25.5	.4	13.9	3.0	7.9	5.4	12.7	22.0
Mass.	1.9	4.9	0.1	11.4	2.3	22.1	1.2	5.7	3.4	22.9	24.0
R. I.	23.9	10.1	12.1	6.0	10.1	12.2	1.1	2.6	2.1	7.3	12.5
Conn.	7.8	10.1	4.7	10.8	6.7	12.0	6.1	6.9	4.7	13.3	16.9
N. Y.	1.1	2.9	0.4	11.6	3.2	12.1	9.5	11.5	8.6	17.5	22.2
Totals	3.3	5.0	0.9	13.2	2.4	17.3	3.8	8.0	6.1	17.0	23.0

During 1929, the 32 permanent and 22 temporary agents worked a total of 90,987 hours; 17.8% of which was performed by the temporary men. The average permanent agent worked 336.3 eight hour working days during the year.

In compiling the time data shown in the above table, the hours worked by Agents Clave and Doore, of Massachusetts, on special assignments were not included. Also, the time spent by the New York Agents (Pratt and Holcomb) on special work was excluded.

Agent Hurford of Rhode Island spent 54.5% of his total time in the office, and 27.4% of the Maine agents' time was consumed in routine office work.

PERSONNEL EMPLOYED ON COOPERATIVE BLISTER RUST CONTROL WORK
IN NEW ENGLAND AND NEW YORK DURING 1929.
(Regardless of length of time employed)

State	Maine	N. H.	Vt.	Mass.	R.I.	Conn.	N.Y.	Totals
State Leaders	1	1	-	1	-	1	1	5
Permanent B.R.C. Agents	5	7	2	7	1	1	9	32
Temporary B.R.C. Agents	19	-	-	-	-	3	-	22
State Checkers and Eradication Assistants	-	4	-	-	-	-	9	13
Foremen	72	26	7	31	1	5	54	196
Scouts	*	23	-	-	-	6	-	29
State Laborers	32	162	50	71	3	13	204	535
Owners' Laborers	1446	-	98	2190	-	48	3315	7097
TOTAL	1575	223	157	2300	5	77	3592	7929

*Included with "Temporary Blister Rust Control Agents".

During 1929, a total of 832 state and federal employees were engaged in cooperative blister rust control work in New England and New York. An additional 7097 individuals (pine or Ribes owners, or their employees) assisted in eradicating Ribes. In the federal control project at Acadia National Park, one foreman and 10 laborers were employed. Thus, 7940 persons actually participated in the field work. Also, many owners paid for the work on their lands, but took no personal part in pulling the bushes; and several hundred other persons permitted the destruction of their cultivated bushes without compensation. Estimated conservatively, 8250 people had more or less of an active part in the control work. The blister rust control agents also reported that 4996 individuals gave general support to the work; making a total of approximately 13,250 people who cooperated directly or indirectly in the control work.

STATE AND FEDERAL COOPERATIVE BLISTER RUST CONTROL FUNDS USED
FOR ALL PROJECTS IN NEW ENGLAND AND NEW YORK DURING THE CALENDAR YEAR 1929.

Source of Funds	State Appropriations	Nursery Funds	Town Funds	Individual Funds Or Labor	All Other Coop. State Funds	Total State Funds	Total Federal \$ for \$ Funds	Total State and Federal Funds
Maine	\$6,364.44	\$500.00	\$9,429.83	\$8,261.32	-	\$24,555.59	\$21,535.34	\$46,090.93
N. H.	17,484.53	-	29,506.99	2,814.79	-	49,806.31	30,660.33	80,466.64
Vt.	1,550.93	-	27.00	5,791.94	-	7,369.87	4,771.89	12,141.76
Mass.	18,978.40	2,756.79	-	10,183.69	\$2,141.90	34,060.78	24,628.16	58,688.94
R. I.	3,321.86	-	-	-	-	3,321.86	2,550.24	5,872.10
Conn.	8,022.42	-	2,359.46	326.75	59.98	10,768.61	8,661.63	19,430.24
N. Y.	78,570.05	-	-	23,070.80	-	101,640.85	27,332.36	128,973.21
TOTALS	\$134,292.63	\$3,256.79	\$41,323.28	\$50,449.29	\$2,201.88	\$231,523.87	\$120,139.95	\$351,663.82

1. The Government paid 34.2% and the state and their cooperators 65.8% of the total costs of all cooperative blister rust control activities in New England and New York during 1929.

2. Comparison of cooperative expenditures in New England and New York paid from various sources during 1928 and 1929:

Source of Funds	Amount Expended 1928	Amount Expended 1929	% Increase or Decrease Over 1928	Percent of Total Expenditures	
				1928	1929
Federal \$ For \$ Money	\$131,129.82	\$120,139.95	-8.4	36.9	34.2
State Appropriations	125,671.02	134,292.63	+6.8	35.4	38.2
Town Appropriations	39,038.73	41,323.28	+5.9	11.0	11.8
Individual Funds	54,667.68	50,449.29	-7.7	15.4	14.3
Nursery Funds	3,993.17	3,256.79	-18.5	1.1	0.9
All Other State Funds	627.19	2,201.88	+251.0	0.2	0.6
TOTAL	\$355,127.61	\$351,663.82	- 0.9	100.0	100.0

3. Comparison of amount of state funds derived from various sources during 1928 and 1929 in New England and New York:

Source of Funds	Percent of Total State Funds	
	1928	1929
State Appropriations	56.1	58.0
Town Appropriations	17.4	17.8
Individual Funds	24.4	21.8
Nursery Funds	1.8	1.4
All Other State Funds	0.3	1.0

A total of \$231,523.87 state money was expended during 1929. This is \$7,526.08 more than was spent in 1928, and represents an increase of 3.4%.

4. Comparison of percent of total state funds, in each state, derived from State Appropriations in New England and New York:

State	Maine	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	Total
1928	23.4	37.5	28.0	59.0	84.8	60.9	75.3	56.1
1929	25.9	35.1	21.0	55.7	100.0	74.5	77.3	58.0

All states, except New Hampshire and Vermont, spent more money from state appropriations in 1929 than during the previous year. Corresponding increases and decreases are noted in the percentage of total state expenditures in each state derived from the respective state appropriations, except in Massachusetts where a decrease of 3.3% occurred in the total state expenditures obtained from this source.

5. Percent of total state funds, in each state, expended from Town Appropriations:

Year	Maine	N. H.	Vt.	Conn.	Totals
1928	38.2	53.6	1.3	16.3	17.4
1929	38.4	59.2	0.4	21.9	17.8

In New Hampshire and Connecticut, where more town funds were expended during 1929 than in 1928, corresponding increases of 6.4% and 5.6%, respectively, occurred in the amount of total state funds used from this source. Although less town money was expended in Maine during 1929, the proportion of the total state expenditures shared by individuals was 0.2% greater than in 1928. Less town funds were expended in Vermont during 1929 than in 1928 and a corresponding decrease occurred in the proportionate part of the total state expenditures derived from this source.

6. Percent of total state funds, in each state, expended by Individual Cooperators in New England and New York:

Year	Maine	N.H.	Vt.	Mass.	Conn.	N.Y.	Totals
1928	36.5	8.9	70.7	30.1	20.8	24.7	24.4
1929	33.7	5.7	78.6	29.9	3.0	22.7	21.8

In all states except Massachusetts, less individual money obtained during 1929 than in 1928. However, in that state the percentage of the total state funds expended from this source was 0.2% less than in 1928, while in Vermont, where the individual expenditures were greater in 1928, the proportionate share was 7.9% more in 1929 than during the preceding year.

7. Special nursery funds were used in two states (Maine and Massachusetts) during 1929. In Maine, the funds were used for nursery inspection under Briscoe's direction. The \$2,756.79 expenditure in Massachusetts was for nursery sanitation work, which is reported in detail on page 89.

8. The expenditure listed under "All Other Cooperative State Funds" represents money spent on control work by other state departments in Massachusetts, and the State Forestry Department in Connecticut.

9. Total state funds expended during 1928 and 1929 in New England and New York:

State	1928	1929	% Increase or Decrease Over 1928
Maine	\$26,213.76	\$24,555.59	-6.3
N. H.	51,071.27	49,806.31	-2.5
Vt.	8,253.29	7,369.87	-10.7
Mass.	31,443.46	34,060.78	+8.3
R. I.	3,280.57	3,321.86	+1.2
Conn.	9,386.07	10,768.61	+14.7
N. Y.	94,349.37	101,640.85	+7.7
TOTALS	\$223,997.79	\$231,523.87	+3.4

10. Federal \$ for \$ cooperative funds expended in New England and New York during 1928 and 1929:

State	1928	1929	% Increase or Decrease Over 1928
Maine	\$21,124.88	\$21,535.34	+1.9
N. H.	31,525.18	30,660.33	-2.8
Vt.	10,430.15	4,771.89	-54.2
Mass.	26,846.15	24,628.16	-8.3
R. I.	2,446.07	2,550.24	+4.2
Conn.	9,623.18	8,661.63	-9.9
N. Y.	29,134.21	27,332.36	-6.2
TOTALS	\$131,129.82	\$120,139.95	-8.4

11. Percent of total state and federal funds, in each state, expended from federal \$ for \$ money in New England and New York:

Year	Maine	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	Totals
1928	44.6	38.2	55.8	46.1	42.7	50.6	23.6	36.9
1929	46.7	38.1	39.3	41.9	43.4	44.6	21.2	34.2

During the calendar year 1929, federal funds were matched on a \$ for \$ basis in all cooperating states.

The proportional part of the total costs paid by the Government, in each state, ranged from 21.2% in New York to 46.7% in Maine.

Item 10 shows there were decreases during 1929 in federal expenditures in all states, except Maine and Rhode Island, and a decrease of 8.4% for all states over the previous year. The large decrease of 54.2% in Vermont was due to employing only two agents (instead of three) during the year, and to transferring these men to quarantine inspection work during the spring and fall months. This arrangement was necessary in order that the state might meet federal expenditures on a \$ for \$ basis.

TOTAL STATE AND FEDERAL EXPENDITURES, BY PROJECTS,
IN NEW ENGLAND AND NEW YORK DURING CALENDAR YEAR 1929.

STATE AND FEDERAL COOPERATIVE BLISTER RUST CONTROL EXPENDITURES, BY PROJECTS,
IN NEW ENGLAND AND NEW YORK DURING THE CALENDAR YEAR 1929.

In order to give a clear conception of cooperative expenditures, by projects, the following summary lists comparative data for the years 1925 to 1929, inclusive. (For basis of projects, see detailed description for each state on sheets number 70 to 78 .)

Summary of Total State and Federal Expenditures, By Projects,
In New England and New York.

Year	1925	1926	1927	1928	1929
Total Amount Expended					
By All Cooperators	\$313,971.52	\$324,306.33	\$345,348.50	\$355,127.61	\$351,663.82
Percent of total, by projects:					
Ribes Eradication.....	44.1	45.7	44.4	44.5	48.7
B.R.C.A.A.....	37.6	35.1	33.7	32.8	30.4
Supervision.....	10.6	11.2	6.9	6.4	5.0
Eradication Assistants and Checkers.....	2.8	0.9	4.8	5.6	5.2
Field Data.....	2.7	3.5	6.6	5.8	5.2
Miscellaneous.....	1.7	3.4	2.0	1.7	2.0
Ribes Compensation.....	0.5	0.2	0.5	0.5	0.4
Nursery Sanitation.....	-	-	1.1	1.6	0.9
Black Currant Eradication.	-	-	-	1.1	2.2

Summary of Total State Expenditures, By Projects, in New England and New York.

Total Amount Cooperative State Expenditures	\$182,872.40	\$194,038.26	\$212,887.60	\$223,997.79	\$231,523.87
Percent of total, by projects:					
Ribes eradication.....	74.6	75.1	70.4	69.1	72.8
Supervision.....	7.3	7.8	2.9	3.4	2.3
B.R.C.A.A.....	5.2	4.5	2.4	1.9	2.2
Field Data.....	4.7	5.7	10.8	9.1	7.8
Eradication Assistants and Checkers.....	4.5	1.5	7.7	8.9	6.5
Miscellaneous.....	2.8	5.1	3.2	2.6	3.0
Ribes Compensation.....	0.9	0.3	0.8	0.8	0.7
Nursery Sanitation.....	-	-	1.8	2.5	1.4
Black Currant Eradication.	-	-	-	1.7	3.3

Summary of Total Federal Expenditures, By Projects, in New England and New York.

Total Amount Federal Expenditures	\$131,098.84	\$130,268.07	\$132,460.90	\$131,129.82	\$120,139.95
Percent of Total, by Projects:					
B.R.C.A.A.....	82.8	80.7	84.1	85.6	84.9
Supervision.....	15.3	16.4	13.3	11.6	10.3
Ribes Scouting (Erad.)....	1.6	2.1	2.6	2.5	2.2
Eradication Assistants and Checkers.....	0.3	-	-	-	2.6
Miscellaneous.....	-	0.6	-	-	-
Field Data.....	-	0.2	-	-	-
Nursery Sanitation.....	-	-	-	0.3	-

Percent Of Total Cost Of Projects In New England And New York
Paid By Government.

Year	1925	1926	1927	1928	1929
B.R.C.A.A.....	91.9	92.3	95.7	96.4	95.3
Supervision.....	60.1	58.6	73.9	66.6	70.3
Ribes Scouting (Eradication)....	1.5	1.8	2.3	2.1	1.6
Eradication Assistants And Checkers.....	4.5	-	-	-	17.4
Field Data.....	-	2.6	-	-	-
Nursery Sanitation.....	-	-	-	6.0	-
Miscellaneous.....	-	7.9	-	-	-

STATE AND FEDERAL EXPENDITURES ON PROJECT "SUPERVISION"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid
Maine	\$1121.94	\$3333.59	\$4455.53
N. H.	1728.17	3685.39	5413.56
Vt.	795.17	69.16	864.33
Mass.	555.83	3586.65	4142.48
R. I.	300.00	629.40	929.40
Conn.	712.51	1050.63	1763.14
N. Y.		McIntyre's salary and expenses	
Totals	\$5213.62	\$12,354.82	\$17,568.44

The expenditures made on this project include salaries and expenses of all the state leaders, except McIntyre; also in New Hampshire, Massachusetts, and Connecticut, the wages paid clerks for part time spent on blister rust control office work. In Vermont, the time of Merrill and Ross, while on blister rust control work, was charged to this project. The state expenditure in Rhode Island represented an arbitrary amount to cover the cost of supervisory activities by Stene and Lewis. In Rhode Island and Connecticut, one-fourth of the state leaders' time was charged to "Supervision". In New York, McIntyre's salary and expenses were paid from other funds, consequently no charge was made against "Supervision" in that state. All of Dr. York's time was included under "Field Data".

In comparing total expenditures for "Supervision" in the various states during 1929 with the previous year, increases are noted as follows: Maine, 2.5%; Massachusetts, 7.8%; Rhode Island, 8.0%; and Connecticut, 6.3%; while decreases occurred in New Hampshire, 14.7%; and Vermont, 65.8%. The slight increases in the four states listed above, can be attributed to salary increases to the state leaders. The apparent large decrease in Vermont was due to no state leader being employed during 1929, while the decrease in New Hampshire resulted from less state money being expended for temporary office assistance during the eradication season.

THE HISTORY OF THE CITY OF BOSTON

The first settlement of the city of Boston was made in 1630 by a group of Puritan settlers from England. They came to the city in search of religious freedom and a place to practice their faith. The city was founded on a small island in the harbor, and the settlers built a fort to protect themselves from the Native Americans. The city grew rapidly, and by 1639 it had a population of over 1,000 people. The city was the center of the Puritan movement in New England, and it played a major role in the development of the American colonies.

The city of Boston was the first to establish a public school system, and it was the first to have a city government. The city was the center of the American Revolution, and it played a major role in the development of the United States. The city was the first to have a city government, and it was the first to have a public school system. The city was the center of the American Revolution, and it played a major role in the development of the United States.

STATE AND FEDERAL COOPERATIVE EXPENDITURES ON
PROJECT - "BLISTER RUST CONTROL AGENT ACTIVITIES"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% B.R.C.A.A. Paid By		% Total State Expenditures Paid For B.R.C.A.A.	% Total Federal Expenditures Paid For B.R.C.A.A.	% Total State And Federal Expendi- tures (All Projects) Paid For B.R.C.A.A.
				State	Gov't.			
Maine	\$3031.68	\$16,936.02	\$19,967.70	15.2	84.8	12.4	78.6	43.3
N. H.	117.05	26,974.94	27,091.99	0.4	99.6	0.2	88.0	33.7
Vt.	-	4,702.73	4,702.73	-	100.0	-	98.6	38.3
Mass.	46.68	21,041.51	21,088.19	0.2	99.8	0.1	85.4	35.9
R. I.	-	1,920.84	1,920.84	-	100.0	-	75.3	32.7
Conn.	1451.37	6,182.62	7,633.99	19.0	81.0	13.5	71.4	39.3
N. Y.	358.89	24,173.65	24,532.54	1.5	98.5	.4	88.4	19.0
Totals	\$5005.67	\$101,932.31	\$106,937.98	4.7	95.3	2.2	84.9	30.4

The funds expended on this project paid the salaries and expenses of the permanent blister rust control agents; and, in a few cases, temporary state or federal agents doing similar work. It also includes small expenditures for educational material. In Rhode Island and Connecticut, three quarters of the state leaders' salaries and expenses were charged to "Blister Rust Control Agent Activities". The state expenditure in New York was for Agent Nichols' expenses.

Comparing total expenditures for this project in the various states during 1929 with the preceding year, decreases occurred in all states, except Connecticut, as follows: Maine, 2.4%; New Hampshire, 3.9%; Vermont, 47.6%; Massachusetts, 9.2%; Rhode Island, 1.4%; and New York, 11.3%. The increase in Connecticut amounted to 14.3%, and was primarily due to the expenditure of more state money for temporary agents during 1929. The large decrease of 47.6% in Vermont resulted from only two agents being employed during 1929, and the assignment of these men to quarantine inspection work during the fall and spring months. This arrangement was necessary in order that the state might meet federal expenditures on a \$ for \$ basis. The transfer of Agent McNerney to quarantine work produced the decrease of 9.2% in Massachusetts.

STATE AND FEDERAL EXPENDITURES ON PROJECT - "RIBES ERADICATION"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Ribes Eradica- tion Paid By		% Total State Expenditures Paid For Ribes Eradication	% Total Federal Expenditures Paid For Ribes Eradication	% Total State And Federal Expendi- tures (All Projects) Paid For Ribes Erad.
				State	Gov't.			
Maine	\$19,693.25	\$1265.73	\$20,958.98	94.0	6.0	80.2	5.9	45.5
N. H.	40,609.40	-	40,609.40	100.0	-	81.5	-	50.46
Vt.	6,495.47	-	6,495.47	100.0	-	88.1	-	53.4
Mass.	29,729.73	-	29,729.73	100.0	-	87.3	-	50.7
R. I.	No wild Ribes eradication work performed.							
Conn.	6,606.16	1428.38	8,034.54	82.2	17.8	61.3	16.5	41.4
N. Y.	65,466.48	-	65,466.48	100.0	-	64.4	-	50.8
Totals	\$168,600.49	\$2694.11	\$171,294.60	98.4	1.6	72.8	2.2	48.7

The expenditures for "Ribes Eradication" paid the wages of men employed in pulling Ribes, including owners' labor, linemen, scouts and foremen. The board and lodging costs of the men in the state camp in New York are also included. However, the wages of these men are correspondingly lower than those paid in other states. The costs of the eradication assistants in New York and the state checkers in New Hampshire are not included under this project, but are kept separate and listed on page 65.

The federal expenditures were for several temporary men used on Ribes scouting in Maine and Connecticut.

STATE AND FEDERAL EXPENDITURES ON PROJECT - "ERADICATION ASSISTANTS AND CHECKERS" IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Eradication Assistants and Checkers Paid By		% Total State Expenditures Paid For Eradication Assistants and Checkers	% Total Federal Expenditures Paid For Eradication Assistants and Checkers	% Total State And Federal Expenditures (All Projects) Paid For Eradication Assistants And Checkers
				State	Gov't.			
N. H.	\$3,163.71	-	\$3,163.71	100.0	-	6.35	-	3.93
N. Y.	11,832.91	\$3158.71	14,991.62	78.9	21.1	11.6	11.6	11.6
Totals	\$14,996.62	\$3158.71	\$18,155.33	82.6	17.4	6.5	2.6	5.2

This expenditure in New Hampshire was for four state checkers during the period May 1 to September 30. The New York cost covers the employment of eradication assistants; the federal funds being used to pay the wages of several of these men during the period April 1 to June 30.

Such expenditures, although closely allied to the project "Ribes Eradication", are considered as a separate project.

STATE EXPENDITURES ON PROJECT - "RIBES COMPENSATION" IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	% Total State Expenditures Paid For "Ribes Compensation"	% Total State and Federal Expenditures (All Projects) Paid For "Ribes Compensation"
N. H.	\$3.71	0.01	0.01
Vt.	27.00	0.4	0.2
Mass.	971.75	2.9	1.6
Conn.	27.25	0.3	0.1
N. Y.	373.75	0.3	0.3
Totals	\$1408.46	0.7	0.4

The compensation listed for Massachusetts was for bushes destroyed in 1928. In this state, compensation claims for cultivated Ribes destroyed during 1929 are not settled until the spring of 1930.

STATE EXPENDITURES FOR PROJECT - "NURSERY SANITATION"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	% Total State Expendi- tures Paid For Nursery Sanitation	% Total State And Federal Expenditures (All Projects) Paid For Nursery Sanitation
Maine	\$500.00	2.0	1.1
Mass.	2,756.79	8.1	4.7
Totals	\$3,256.79	1.4	.9

The Maine expenditure was for inspection work in the state nursery. In Massachusetts, the State Department of Agriculture expended \$2,756.79 in eradicating Ribes from official control areas established around several commercial, pine-growing nurseries. A detailed report of this nursery sanitation work is given on page 89. In addition to the funds listed above, a total of \$757.32 state money and \$75.00 federal funds were expended on nursery sanitation in Connecticut. Also, in New York, the protection zones around five state nurseries were extended from 900 to 1500 feet. This work in Connecticut and New York is included in the regular Ribes eradication summaries of this report (see page 27 for details).

STATE EXPENDITURES FOR PROJECT - "BLACK CURRANT ERADICATION"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	% Total State Expendi- tures Paid For Black Currant Eradication	% Total State And Fed- eral Expenditures (All Projects) Paid For Black Currant Erad- ication
R. I.	\$2,991.86	90.1	51.0
N. Y.	4,745.10	4.7	3.7
Totals	\$7,736.96	3.3	2.2

In Two states (Rhode Island and New York), black currant eradication was conducted as a special project during 1929. This work is closely allied to the regular "Ribes Eradication" project, but when performed as a special project, the data are kept separate from the regular control work.

STATE EXPENDITURES FOR PROJECT - "FIELD DATA" IN NEW ENGLAND
AND NEW YORK DURING 1929.

State	Amount Paid By State	% Total State Expenditures Paid For "Field Data"	% Total State And Fed- eral Expenditures (All Projects) Paid For "Field Data"
N. H.	\$3,977.66	7.98	4.94
Conn.	590.30	5.5	3.0
N. Y.	13,589.63	13.4	10.5
Totals	\$18,157.63	7.8	5.2

The New Hampshire expenditure represents the cost of the state checkers during the period January 1 to April 30 and October 1 to December 31, when they were employed on special field studies.

The money used on this project in Connecticut was for scouting to eliminate non-pine lands.

The large expenditure in New York includes the cost of York, Littlefield, and Snell on investigational work. It also includes \$1,242.25 spent inspecting white pine plantations.

STATE EXPENDITURES ON PROJECT - "MISCELLANEOUS"
IN NEW ENGLAND AND NEW YORK DURING 1929.

State	Amount Paid By State	% Total State Expendi- tures Paid For "Miscellaneous"	% Total State And Fed- eral Expenditures (All Projects) Paid For "Miscellaneous"
Maine	\$208.72	0.8	0.4
N. H.	206.61	0.4	0.25
Vt.	52.23	0.7	0.4
R. I.	30.00	0.9	0.5
Conn.	1,381.02	12.8	7.1
N. Y.	5,269.05	5.2	4.1
Totals	\$7,147.63	3.0	2.0

The expenditures on this project were for miscellaneous items, which were not directly chargeable to any of the other blister rust control projects.

The \$1,381.02 spent in Connecticut covers the cost of a new automobile for the state cooperator, and other small miscellaneous expenditures.

The \$5,269.05 expenditure in New York covers the cost of time lost by rainy weather which was not chargeable to any particular job, some gas and oil, office supplies and furniture, and other materials.

SUMMARY OF STATE AND FEDERAL EXPENDITURES, BY PROJECTS,
IN NEW ENGLAND AND NEW YORK DURING 1929.

Project	State Expendi- tures	Federal Expendi- tures	Total Expendi- tures	% Total State Expendi- tures	% Total Federal Expendi- tures	% Total State And Federal Expendi- tures
Supervision	\$5,213.62	\$12,354.82	\$17,568.44	2.3	10.3	5.0
Ribes Eradication	168,600.49	2,694.11	171,294.60	72.8	2.2	48.7
B.R.C.A.A.	5,005.67	101,932.31	106,937.98	2.2	84.9	30.4
Ribes Com- pensation	1,408.46	-	1,408.46	0.7	-	0.4
Nursery Sanitation	3,256.79	-	3,256.79	1.4	-	.9
Erad.Assist. And Checkers	14,996.62	3,158.71	18,155.33	6.5	2.6	5.2
Field Data	18,157.63	-	18,157.63	7.8	-	5.2
Black Currant Eradication	7,736.96	-	7,736.96	3.3	-	2.2
Miscellaneous	7,147.63	-	7,147.63	3.0	-	2.0
TOTALS	\$231,523.87	\$120,139.95	\$351,663.82	100.0	100.0	100.0

For basis of projects, see detailed description for each state on following pages.

PROJECT SUMMARY OF 1929 EXPENDITURES IN
EACH OF THE NORTHEASTERN STATES.

STATE AND FEDERAL EXPENDITURES IN MAINE, BY PROJECTS,
DURING CALENDAR YEAR 1929.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Expenditures (All Projects) Paid For
Supervision	\$1,121.94	\$3,333.59	\$4,455.53	4.6	15.5	9.7
B.R.C.A.A.	3,031.68	16,936.02	19,967.70	12.4	78.6	43.3
Ribes Eradication	19,693.25	1,265.73	20,958.98	80.2	5.9	45.5
Nursery Sanitation	500.00	0	500.00	2.0	-	1.1
Ribes Com- pensation	0	0	0	-	-	0
Misc.	208.72	0	208.72	0.8	-	.4
Totals	\$24,555.59	\$21,535.34	\$46,090.93	100.0	100.0	100.0

Basis For Projects

Supervision: Salary and expenses of state leader, Government paying salary, and state the expenses.

B.R.C.A.A.: Salaries and expenses of permanent agents, and part of cost of temporary agents for time spent on B.R.C.A.A.-educational material.

Ribes Eradication: Owners' labor, town foremen, and crews, time spent by federal and state temporary agents in scouting for Ribes.

Nursery Sanitation: Funds spent under Briscoe's direction, on inspection of state nurseries.

STATE AND FEDERAL EXPENDITURES IN NEW HAMPSHIRE
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Expend. Paid For	% Total Federal Expend. Paid For	% Total State And Federal Exp. (All pro- jects) Paid For
Supervision	\$1,728.17	\$3,685.39	\$5,413.56	3.47	12.0	6.73
B.R.C.A.A.	117.05	26,974.94	27,091.99	.23	88.0	33.67
Ribes Eradication	40,609.40	-	40,609.40	81.54	-	50.47
Checkers	3,163.71	-	3,163.71	6.35	-	3.93
Field Data	3,977.66	-	3,977.66	7.98	-	4.94
Ribes Compensation	3.71	-	3.71	0.01	-	0.01
Miscellaneous	206.61	-	206.61	0.42	-	0.25
TOTALS	\$49,806.31	\$30,660.33	\$80,466.64	100.0	100.0	100.00

Basis For Projects

Supervision: Salary and expenses of state leader, paid by Government - salary of blister rust clerk at Concord office (\$35. of which is paid by Government) - and salaries of temporary clerks at Concord office during eradication season.

B.R.C.A.A.: Salaries and expenses of blister rust control agents - educational material.

Ribes Eradication: Wages and transportation expenses of laborers, scouts, and foremen engaged in Ribes eradication work.

Checkers: Cost of four inspectors, during May-September, while checking on Ribes eradication.

Field Data: Cost of inspectors, during January-April and October-December, while engaged in special field studies.

STATE AND FEDERAL EXPENDITURES IN VERMONT
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Exp. (All pro- jects) Paid For
Supervision	\$795.17	\$69.16	\$864.33	10.8	1.4	7.2
B.R.C.A.A.	0	4,702.73	4,702.73	-	98.6	38.8
Ribes Eradication	6,495.47	0	6,495.47	88.1	-	53.4
Ribes Compensation	27.00	0	27.00	0.4	-	0.2
Miscellaneous	52.23	0	52.23	.7	-	.4
Totals	\$7,369.87	\$4,771.89	\$12,141.76	100.0	100.0	100.0

Basis For Projects

Supervision: Salaries and expenses of Merrill and Ross on blister rust work. Government expenditure was for part time clerk at Montpelier office at \$50. per month. This clerk resigned during February, but was not replaced.

B.R.C.A.A.: Total salaries and expenses of Bradder and Rose paid by Government while on blister rust control agent work in Vermont. Time spent on quarantine work during spring and fall months paid from Plant Quarantine and Control Administration funds.

Ribes Eradication: Owners' labor and wages of foremen; state pays excess labor charges and cost of transportation of foremen between jobs.

STATE AND FEDERAL EXPENDITURES IN MASSACHUSETTS
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Spent By State	Amount Spent By Gov't.	Total Amount Spent	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Exp. (All pro- jects) Paid For
Supervision	\$555.83	\$3,586.65	\$4,142.48	1.6	14.6	7.1
B.R.C.A.A.	46.68	21,041.51	21,088.19	0.1	85.4	35.9
Ribes Eradication	29,729.73	0	29,729.73	87.3	-	50.7
Nursery Sanitation	2,756.79	0	2,756.79	8.1	-	4.7
Ribes Compensation	971.75	0	971.75	2.9	-	1.6
TOTALS	\$34,060.78	\$24,628.16	\$58,688.94	100.0	100.0	100.0

Basis For Projects

Supervision: Salary and expenses of state leader; former paid by Government and latter by state - part of salary (\$20. per month) of clerk at state office for assistance on blister rust work.

B.R.C.A.A.: Salaries and expenses of blister rust control agents - educational material.

Ribes Eradication: Owners' labor, state inspectors (scouts and foremen).

Nursery Sanitation: Cost of inspecting nurseries and their environs for Ribes and eradicating such bushes, paid from special state nursery funds.

STATE AND FEDERAL EXPENDITURES IN RHODE ISLAND
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Exp. (All pro- jects) Paid For
Supervision	\$300.00	\$629.40	\$929.40	9.0	24.7	15.8
B.R.C.A.A.	-	1,920.84	1,920.84	-	75.3	32.7
Black Currant Eradication	2,991.86	-	2,991.86	90.1	-	51.0
Misc.	30.00	-	30.00	0.9	-	0.5
TOTALS	\$3,321.86	\$2,550.24	\$5,872.10	100.0	100.0	100.0

Basis For Projects

Supervision: One-fourth of Hurford's federal salary and expenses.
The state expenditure represents an arbitrary amount
to cover the supervisory activities of Stone and Lewis.

B.R.C.A.A.: Three-quarters of Hurford's federal salary and
expenses.

Black Currant Eradication: Wages and transportation expenses of four
state scouts used on this project during
1929.

STATE AND FEDERAL EXPENDITURES IN BUREAU PROJECTS
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	Total State Exp. Paid For	Total Federal Exp. Paid For	Total State and Federal Exp. (All Projects) Paid For
Supervision	\$300.00	\$229.40	\$529.40	9.0	24.7	15.8
B.C.A.A.	-	1,250.84	1,250.84	-	15.3	35.7
Black Current Production	2,991.86	-	2,991.86	30.1	-	51.0
Ac.	30.00	-	30.00	0.9	-	0.5
Trls	\$1,721.86	\$2,550.34	\$4,272.20	100.0	100.0	100.0

Basis for Projects

Supervision: One-fourth of Hartford's federal salary and expenses. The state expenditure represents an arbitrary amount to cover the supervisory activities of Stone and Lewis.

B.C.A.A.: Three-fourths of Hartford's federal salary and expenses.

Black Current Production: Taxes and transportation expenses of both state agents used on this project during 1929.

STATE AND FEDERAL EXPENDITURES IN CONNECTICUT
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Exp. (All Projects) Paid For
Supervision	\$712.51	\$1,050.63	\$1,763.14	6.6	12.1	9.1
B.R.C.A.A.	1,451.37	6,182.62	7,633.99	13.5	71.4	39.3
Ribes Eradication	6,606.16	1,428.38	8,034.54	61.3	16.5	41.4
Field Data	590.30	0	590.30	5.5	0	3.0
Ribes Compensation	27.25	0	27.25	0.3	-	.1
Misc.	1,381.02	0	1,381.02	12.8	-	7.1
TOTALS	\$10,768.61	\$8,661.63	\$19,430.24	100.0	100.0	100.0

Basis For Projects

Supervision: One-quarter of Riley's federal salary and expenses - blister rust expenses for Filley - and part of salary paid to clerk at New Haven office out of state blister rust funds at rate of \$50. per month during January - June, and \$55. per month from July - December.

B.R.C.A.A.: Salary and expenses of Clark - three-quarters of cost for Riley - salaries of state and federal temporary agents while engaged in educational and service work - educational material.

Ribes Eradication: Owners' labor, state laborers, scouts and foremen - federal expenditure was for scout work performed by temporary agents. The cost of this project includes \$757.32 state money and \$75.00 federal funds (for scouting) expended in connection with nursery sanitation work.

Field Data: Cost of scout work to eliminate non-pine areas. In this connection, 293,090 acres were eliminated during 1929 as not containing sufficient pine to justify the cost of eradicating Ribes.

Miscellaneous: Includes cost of new automobile purchased by state
cooperator, and other small expenditures for
miscellaneous items.

STATE AND FEDERAL EXPENDITURES IN NEW YORK
DURING CALENDAR YEAR 1929, BY PROJECTS.

Project	Amount Paid By State	Amount Paid By Gov't.	Total Amount Paid	% Total State Exp. Paid For	% Total Federal Exp. Paid For	% Total State And Federal Exp. (All Projects) Paid For
Supervision	-	-	-	-	-	-
B.R.C.A.A.	\$358.89	\$24,173.65	\$24,532.54	.4	88.4	19.0
Ribes Eradication	65,466.48	-	65,466.48	64.4	-	50.8
Eradication Assistants	11,832.91	3,158.71	14,991.62	11.6	11.6	11.6
Field Data	13,589.67	-	13,589.67	13.4	-	10.5
Black Currant Eradication	4,745.10	-	4,745.10	4.7	-	3.7
Ribes Compensation	378.75	-	378.75	0.3	-	.3
Misc.	5,269.05	-	5,269.05	5.2	-	4.1
TOTALS	\$101,640.85	\$27,332.36	\$128,973.21	100.0	100.0	100.0

Basis For Projects

Supervision: No expenditures charged to this project - the state leader's salary and expenses are not paid from blister rust control funds.

B.R.C.A.A.: Salaries and expenses of blister rust control agents paid by Government, except Nichols' expenses which are paid by the state.

Ribes Eradication: Owners' labor and wages of state laborers, scouts, and foremen; also, in many cases, includes subsistence expenses paid to foremen and scouts, and transportation expenses of these men.

Eradication Assistants: Salaries and expenses of eradication assistants. Government expenditure of \$3,158.71 represents salaries paid these men during the period April 1-June 30, when several of them were temporarily carried on the federal payroll.

Field Data: Cost of York, Littlefield, Snell, and assistants on field studies. Also includes \$1,242.25 expended inspecting white pine plantations.

Black Currant Eradication: State expenditures on special black currant eradication work.

Miscellaneous: Includes time paid for but lost by stormy weather and not chargeable to any particular job, stationery, some gasoline and oil, office furniture, and other materials.

SUMMARY, BY STATES, OF COOPERATIVE
BLISTER RUST CONTROL ACTIVITIES IN THE NORTHEASTERN
AND LAKE STATES DURING THE PERIOD 1918 TO 1929, INCLUSIVE.

SUMMARY, BY STATES, OF COOPERATIVE BLISTER RUST CONTROL ACTIVITIES IN THE NORTHEASTERN AND LAKE STATES DURING THE PERIOD 1918-1929, INCLUSIVE.

MAINE

Policy: The state cooperates with towns and individuals in Ribes eradication, by furnishing scouts to systematically examine town control areas to determine the Ribes concentrations, which are to be eradicated by individual owners, working under the supervision of town foremen paid from town funds. The Ribes concentrations cover only about 15 percent of the control areas, consequently the Ribes on 85 percent of the total acreage are eradicated by the scouts. However, the bushes pulled by the scouts represent less than one percent of the total number destroyed.

Acreage of pine: Pure, 588,450 acres; mixed, 1,040,060 acres; pine restocking in types other than pine, 1,549,367 acres; total, 3,177,877 acres.

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
	1918-1921	30	\$1,163.07	0	0
	1922-1929	10,001	69,891.68	346	\$59,773.52
	<u>Totals</u>	<u>10,031</u>	<u>\$71,054.75</u>	<u>346</u>	<u>\$59,773.52</u>

<u>Ribes eradication*:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled</u>		<u>Total Cost</u>	<u>Cost Per Acre</u>
			<u>Wild</u>	<u>Cult.</u>		
(Initial and Re-eradication)	1918-1921	180,630	658,729	1,579	19,708.14	\$.109
	1922-1929	2,205,094	14,609,891	97,232	158,047.77	.072
	<u>Totals</u>	<u>2,385,724</u>	<u>15,268,620</u>	<u>98,811</u>	<u>\$177,755.91</u>	<u>\$.075</u>
In Addition On Acadia National Park	1929	1,148	74,373	0	\$1,235.40	\$1.08

*Eradication costs based on the value of owners' labor figured at 40 cents per hour and on the actual cost of paid laborers, town foremen, and scouts. The cost of the latter is only for time actually spent in scouting for Ribes.

Cultivated Ribes Compensation - 1922-1929: None.

Ribes Re-eradication: The above acreage includes 4,582 acres reworked since 1922.

Public Forests: There are no state forests in Maine. Control work was begun during 1929 on the Acadia National Park At Mt. Desert Island, Maine. According to present plans, based on a pre-eradication survey, it will take about two years to complete the initial eradication work on the remaining pine areas and protection strips in the Park.

Plantations: Protected in conjunction with general control work - compared with other states, there are not many white pine plantations in Maine.

Nursery Sanitation: Only a few nurseries in the state - initial control work has been conducted in all these nurseries. During 1929, the Western Maine Forest Nursery at Fryeburg was granted a pine shipping permit under Federal Quarantine #63. This nursery is one of two in the country which have complied with the requirements of the quarantine and received permits to ship white pine interstate. Re-eradication work has also been performed in some of the nurseries.

Ribes nigrum: The control policy in Maine requires the destruction of all cultivated Ribes in white pine areas. Therefore, black currants are eradicated in connection with the regular town control projects. It will, however, be necessary to make special arrangements for eliminating Ribes nigrum outside the agent districts. Many Ribes americanum are cultivated in Maine, but apparently few Ribes nigrum.

Blister rust surveys: During 1920 and 1921, the white pine types were mapped in several towns in Maine - Briscoe had maps and a report prepared of this work - maps used as a basis for control work and as an estimate of pine values. Strip line infection survey made by Frost in 1920 - the pines on red wide strips totalling 38.5 miles in length were examined - a total of 7046 pines were inspected, and 6.3% were found infected - 11 plots, totalling 2.7 acres, were laid out adjacent to the strips, 14.4% of the 970 pines in these plots were diseased - data used for educational purposes. Epidemiology survey made during 1926, by agents and Hirt, of white pine and other forest types, Ribes and infection conditions - maps and summaries prepared at Boston Office.

Infection: General in the commercial range of white pine - based on town units in this region, the percentage of diseased pine ranges from 1 to 10 percent of the total amount of pine - most of the infection has originated since 1918, and is especially abundant in southwestern Maine, notably in Lincoln County - the oldest infection is located at Kittery Point, apparently originated in 1897 from cultivated black currants imported from England. A particularly heavy wave of infection occurred in unprotected areas during 1925.

Investigations: Demonstration control areas at Kittery Point and Brunswick - very little data on these studies available. Infection and effectiveness of control study made by Fosey at Kittery Point - report published. Many pine damage plots laid out by agents - used for demonstration purposes - infection data summarized and used by agents in educational work. - Effectiveness of control studies made by agents during 1929. These data were summarized at the Boston Office, and copies of the summaries sent to the state leader and Washington Office.

Future Work: Complete initial control work on 593,457 acres in agents' districts (basis: estimates by agents of acreage still needing initial eradication in each town) - and on 411,871 acres outside of agents' districts, mostly mixed pine, east of Penobscot River. Re-examination of initial control areas, 2,381,142 acres; estimate one-third, or 793,714 acres, will need intensive reworking. As 4,582 acres have already been re-eradicated of Ribes since 1922, only 789,132 acres will actually need intensive reworking. - Elimination of Ribes nigrum from sections not covered by regular control work. - Additional studies to determine the effectiveness of control.

NEW HAMPSHIRE

Policy: The state cooperates primarily with towns, paying 20 percent of the total costs of the town projects. The control work is performed by state crews (paid from state and town funds) working systematically definite town blocks irrespective of property lines. Some cooperation is also obtained from individual owners. The state assists such persons by paying 20 percent of the costs of control work.

Acreage of pine: Pure, 806,977 acres; mixed, 569,487 acres; pine restocking in types other than pine, 304,790 acres; total 1,681,254 acres.

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
	1918-1921	162	\$10,317.48	162	\$25,860.00
	1922-1929	476	34,119.43	638	237,440.00
	Totals	638	\$44,436.91	800	\$263,300.00

<u>Ribes Eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled</u>		<u>Total Cost</u>	<u>Cost Per Acre</u>
(Initial and Re-eradication)	1918-1921	571,625	Wild	Cult.		
	1922-1929	1,951,884	6,335,690	61,517	116,739.79	\$.204
	Totals	2,523,509	22,769,096	73,894	345,687.16	.177
			29,104,786	135,411	\$462,426.95*	\$.183

In Addition on

White Mt. National

Forest	1924-1929	6,384	142,556	-	\$2,271.24	\$.356
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*Eradication costs based on total cost of owners' labor, state labor, scouts, and foremen.

Cultivated Ribes Compensation - 1922-1929: Number persons paid compensation - 22; total number bushes paid for - 558; total amount paid in reimbursement - \$127.47.

Ribes Re-Eradication: The above acreage includes 334,738 acres reworked since 1922. This acreage represents 69.5 percent of all re-eradication work that has been performed in New England and New York.

Public forests: Initial control work completed in all pine areas of state and national forests. A thorough inspection during 1928 of control areas on the National Forest showed re-eradication work would not be needed at least for a few years.

Plantations: Protection secured in conjunction with town control projects. During 1927, the agents made special inspection of 89 plantations, containing 750,000 trees, in order to determine their condition. A special card record was kept for each plantation, and where possible, the owners were interviewed. In conjunction with this work, 61 native stands, containing 5020 acres, were located upon which the owners are practicing forestry.

Nursery sanitation: The state nursery and the two commercial pine growing nurseries in the state have conducted initial and re-eradication work around their properties for several years. In spite of this, considerable pine infection was found in the Keene Nursery during 1928. As a result, this nursery destroyed 30,000 white pine transplants and also arranged for reinspection of the nursery and environs. A single pine infection was also discovered in the state nursery during 1928. This nursery and its environs were thoroughly re-examined for Ribes in 1929.

Ribes nigrum: The town control policy in New Hampshire systematically eliminates cultivated Ribes from all white pine regions; therefore, no special campaign is needed to eradicate black currants. Most of the initial eradication work has been completed in the section of the state where the greater portion of black currants existed.

Blister rust surveys: Because of the general distribution of white pine, a special mapping of such areas is not necessary, especially as the recent epidemiology study gave town information on white pine and other forest types, Ribes, and infection conditions. During 1919, detailed forest type maps were made of the towns of Dover and Kensington - This work developed effective methods of mapping and estimating, and the data were used also for control work and educational purposes. Three years ago, the State Forestry Department completed a forest resource survey, which showed 50 percent of the wood products in New Hampshire were made of white pine. The annual cut of this species varies from 55 to 65 percent of the total lumber cut in the state. Strip line infection surveys were made in 1920 - the pines on rod wide strips, totaling 54.5 miles in length, were examined - a total of 9919 pines were inspected, and 13 percent were found infected - 213 plots, totaling 49.1 acres, were laid out adjacent to the strips; 51.5 percent of the 7014 pines in these plots were diseased. During 1928, a survey was made in 69 backward towns to locate and map the minimum control area, which should be cleared of Ribes to protect the pine. Partly as a result of the facts obtained by this survey, over 30 percent of these towns appropriated for control work in 1929.

Infection: General in commercial pine range, especially severe in northern Connecticut River Valley region - based on town units, the percent of diseased pine ranges from 1-30 percent of the total amount of pine. Also, see strip line data given under "Blister Rust Surveys". Two especially heavy infection areas were located in unprotected tracts during the spring of 1929; one in the vicinity of Moose Mountain in the town of Hanover, and the other along the upper waters of Underwood Brook situated in the northeastern part of Acworth. Both of these infection areas cover a large territory. An acre plot, examined in the Acworth area, showed that 94 out of ever 100 trees were fatally infected with the disease. In many instances, the pines had been so seriously infected that every branch contained several cankers.

Investigations: Demonstration control areas established at Conway and Wolfeboro - latter area re-checked during 1927 - a report of this study is being prepared by Endersbee. Detailed infection studies made by Endersbee at Hooksett, Hampstead, Sunapee, and Littleton - (reports submitted); by Fosey, at Deerfield and Lisbon - (no report); by Richards, at Temple - (preliminary report only). Many damage and demonstration plots laid out by agents - used for educational purposes. Ribes regrowth study made by Newman at Newmarket - (no report submitted). During 1929, effectiveness of control studies were made by the agents in 34 New Hampshire towns. These data were summarized at the Boston Office, and copies of the summaries sent to the state leader and Washington Office to be used for educational purposes.

Office: Maps and records show control work by years - however, most of the early detailed records, by blocks, have been lost or were kept in such poor shape as to be of little value - data since 1922 O.K.

Future Work: Complete initial Ribes eradication 598,668 acres, (basis: estimates by agents of total acreage to be worked in each town - including both pine areas and protection strips) - Re-examination of initial control areas, 2,188,771 acres; estimate 50 percent, or 1,094,385 acres, will need intensive reworking. As 334,738 acres have already been re-eradicated of Ribes since 1922, only 759,647 acres will actually need to be re-worked by crew methods.

VERMONT

Policy: State cooperation with individual owners, who pay all eradication costs, except excess labor charges for state foremen. In few instances, town money has been obtained to pay the excess labor costs.

Acreage of pine: Pure, 103,376 acres; mixed, 238,562 acres; pine restocking in types other than pine, 284,253 acres; total, 626,191 acres.

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
	1918-1921	61	\$4,021.11	0	0
	1922-1929	1617	54,931.70	10	705.90
	Totals	1678	\$58,952.81	10	\$705.90

<u>Ribes Eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled</u>		<u>Total Cost</u>	<u>Cost Per Acre</u>
			<u>Wild</u>	<u>Cult.</u>		
(Initial and Re-eradication)	1918-1921	17,978	272,143	282	\$14,252.51	\$.793
	1922-1929	163,134	1,789,002	5,645	64,856.04	.398
	Totals	181,112	2,061,145	5,927	\$79,108.55	\$.437

(Eradication costs based on the value of owners' labor and on the actual cost of hired laborers and foremen - No scouts employed)

Cultivated Ribes Compensation, 1922-1929: Number persons paid compensation - 110, total number bushes paid for - 1339; total amount paid in reimbursement - \$647.16.

Ribes Re-eradication: The above acreage includes 17,072 acres re-worked since 1922.

State Forests: Initial control work completed on all the principle pine areas of the state forests, except new additions.

Plantations: State office has fairly complete record of plantations. The agents are supplied with an annual list showing distribution of white pine stock from state nurseries. The plantings in the agents districts are worked in conjunction with the regular control program. Special arrangements will be needed to protect plantations outside the agent districts.

Nursery sanitation: Exclusive of state nurseries, which have been protected from blister rust, there are no nurseries growing white pine where sanitation measures are necessary.

Ribes Nigrum: A systematic black currant survey was begun in the agents' districts during the fall of 1928 and continued during 1929. Such work has been completed in towns and partially finished in additional towns. A total of *Ribes nigrum* were located and were destroyed.

Blister rust surveys: (1) White pine areas of state - data suitably recorded on maps for each agent's use. (2) Strip line infection survey made in 1920. The pines on rod wide strips totaling 28 miles in length were examined - a total of 4002 pines were inspected and 3.1% found diseased. (3) Production, value, and use of white pine and other woods - data summarized for entire state, and published in bulletin form. (4) Epidemiology survey of white pine and other forest types, *Ribes*, and infection conditions made during 1926. Maps and summaries prepared at Boston Office.

Infection: General throughout the commercial pine range of state, being especially severe in northern Connecticut River Valley region - based on town units, the percent of diseased pine ranges from 1-30 percent of the total amount of pine - also, see strip line data under "Surveys". Considerable new infection occurred in unprotected areas during 1928.

Investigations: Demonstration control areas at Thetford and Fairlee, Vermont - preliminary reports submitted - no follow up work done. *Ribes* regrowth studies made by Merrill, and reported at 1927 annual conference. Blister rust damage study of merchantable pine made by Filler at Waterford, Vermont - report being prepared. During 1927, six quarter acre infection plots laid out by agents. Also, in cooperation with the extension forester, six permanent demonstration plots were established to show white pine thinning and protection. Seven additional demonstration plots in six towns were laid out in 1928. During the fall of 1928 and spring of 1929, pine infection studies were made by the agents in 14 Vermont towns to determine the effectiveness of the control work. These data were summarized at the Boston Office and copies of the summaries sent to the Forestry Commissioner and to the Washington Office to be used for educational purposes.

Office Records: Maps and card records showing pine location, control areas, plantations, and infection, are in good shape.

Future Work: Complete initial Ribes eradication 135,623 acres - (basis: estimates by agents of acreage remaining to be done in each town. including both pine areas and protection strips - in areas outside the agents' districts, acreage remaining to be worked based on pine acreage (pure and mixed) plus an additional one-fourth acreage for protection strips minus acreage initially cleared of Ribes). Re-examination of initial control areas, 164,040 acres; estimate at least 50 percent, or 82,020 acres, will need intensive reworking. As 17,072 acres have already been re-eradicated since 1922, only 64,948 acres will actually need to be reworked by crew methods.

MASSACHUSETTS

Policy: Cooperation with individuals - state scouts used to examine town areas and to denote sections requiring intensive control work, which will be done by pine owners, under the direction of state foremen.

Acreage of pine: Pure, 450,799 acres; mixed, 337,031 acres; pine restocking in types other than pine, 270,539 acres; total, 1,058,369 acres.

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
	1918-1921	81	\$5,886.22	4	\$1,700.00
	1922-1929	13,297	63,588.28	0	0
	Totals	13,378	\$69,474.50	4	\$1,700.00

<u>Ribes Eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled</u>		<u>Total Cost</u>	<u>Cost Per Acre</u>
			<u>Wild</u>	<u>Cult.</u>		
(Initial and Re-	1918-1921	81,877	2,414,873	10,345	44,674.90	\$.546
Eradication)	1922-1929	1,602,116	9,485,293	210,452	207,485.75	.130
	Totals	1,683,993	11,900,166	220,797	\$252,160.65	\$.150

(Eradication costs based on total cost of owners' labor, state scouts and foremen)

Cultivated Ribes Compensation, 1922-1929: Number persons paid compensation - 310; total number bushes paid for - 19,570; total amount paid in reimbursement - \$6,827.75.

Ribes Re-eradication: The above acreage includes 75,808 acres reworked since 1922. This re-eradicated area represents 15.7% of all such work performed in New England and New York since 1922.

State forests: Initial control work has been completed on practically all pine areas in the state forests. During 1929, control work was conducted in cooperation with the Department of Conservation on 25 lots in 11 towns. In addition, five other state departments cooperated in eradicating Ribes on state lands in 11 towns. This 1929 work resulted in 16,857 acres of state land being cleared of 85,431 wild Ribes and 3,081 cultivated bushes, at a cost of \$3,261.17

Plantations: Protection secured in conjunction with the general control program.

Nursery sanitation: All nurseries growing white pine for public sale were cleared of Ribes prior to 1925. During 1925 and 1926, a special survey was conducted to eradicate all Ribes nigrum from within one mile of all pine growing nurseries. In this work, a total of 217 Ribes nigrum and 319 flowering currants were destroyed. These bushes were owned by 155 persons, but claims were made by only ten persons for loss of 106 bushes. During 1927 and 1928, the protection zone for wild and cultivated Ribes, except nigrum, was increased from 900 to 1500 feet around nine of the main commercial nurseries, and a total of 4942 wild Ribes and 3345 cultivated bushes were destroyed. Fifty persons claimed \$647.15 for loss of 1400 cultivated Ribes. Spot pine infections were found in six nurseries during 1928, but no new outbreaks were located.

The policy of the Division of Plant Pest Control to establish Ribes free conditions in the environs of only the more important white pine producing nurseries was continued during 1929. It is believed that the expenditures necessary for the establishment of Ribes free zones around any additional nurseries would not be justified, because of the relatively limited number of white pines produced. Nursery sanitation measures were applied during 1929 to four commercial nurseries owning areas in eight towns. A total of 720 wild Ribes, 104 black currants, and 1131 other cultivated bushes were destroyed. Only 11 claims for reimbursement were received for the loss 106 cultivated Ribes. Three of the state nurseries of the Department of Conservation were also examined, but no Ribes were located. The spring inspection of the white pines in the Massachusetts nurseries, made by representatives of the Division of Plant Pest Control, resulted in the disease being found in three nurseries. Only six infected trees were located. Future sanitation work will be limited to re-inspection of the environs of those nurseries which have already been initially protected.

Ribes nigrum: A special regulation prohibits the possession of Ribes nigrum in the state. During 1928, Massachusetts began a black currant survey to systematically eliminate such bushes. This work was completed in 12 towns and 1371 black currants were destroyed, excluding 2199 Ribes nigrum eradicated in other Massachusetts towns in connection with the regular field work. This black currant eradication work was continued during 1929 as a special project in three towns (Attleboro, North Attleboro, and Medway) and in conjunction with the regular control work in all other towns where Ribes eradication was performed during 1929. A total of 3541 cultivated black currants were destroyed, and the project completed in 27 towns. The owners of 52 percent of these plantings destroyed their bushes without state aid. These plantings contained 45 percent of the total number of such Ribes eliminated.

Blister rust surveys: Cultivated Ribes census throughout entire state in 1917 - data compiled and a summary report prepared - used as a basis for inspections and eradication of Ribes nigrum. During 1920, strip line infection survey was made - the pines on a rod wide strip totaling 4.4 miles in length were examined - a total of 871 pines were inspected and 5.7% were found infected - 9 plots, totaling 3 acres, were laid out adjacent to the strips; 27% of the 637 pines in these plots were diseased - epidemiology survey by agents during 1926 of white pine and other types, Ribes, and infection - maps and summaries prepared at Boston Office.

Infection: General, but spotted and light, especially in eastern and central parts of the state. In these sections, most of the infections are old ones caused by Ribes nigrum; eradication of most of these bushes in 1917 had a decided effect in checking spread of disease, as wild Ribes are localized in these sections. Also, see strip line data under "Blister Rust Surveys". During 1929, pine infection was reported for the first time in seven additional towns. Scouting by Hodgkins, in the early part of 1930, resulted in diseased pine being found in 25 other Massachusetts towns. To date, pine infection has been located in 310 Massachusetts towns out of a total of 355 in the state. The non-infected towns are either in the metropolitan district of Boston or contain little or no white pine.

Investigations: Demonstration control areas established at Barre and Pembroke - no check study advisable. Pine infection study made by Root at Pembroke, also infection studies made by Pickler at Sandisfield, and by Hodgkins at Swanzey - reports submitted. Cutting out of cankers studies made by Martin at Ipswich, and by Hodgkins at Pembroke - published report by Martin. Damage plots laid out by agents in western Massachusetts - used for demonstration and educational purposes. Sample forest type map made of Duxbury, used as basis for control work. Study on spread of disease from skunk currants started by Clave during 1927 - report presented at annual conference showed only limited spread from such Ribes. During 1928, Clave conducted experiment to determine effectiveness of sodium chlorate in killing skunk currants - preliminary report given at annual conference. This chemical eradication experiment was continued during 1929; the plots sprayed during the previous year were checked and six new plots of skunk currants were sprayed. (See Massachusetts 1929 annual report for details of checks). Also, a few additional plot studies were made of blister rust damage.

Office: Records and maps for most part in good shape.

Future Work: Complete initial eradication, 80,487 acres (based on estimates by agents of acreage still remaining to be done in each town at end of 1929 eradication season - includes both acreages of pine and protection strips). Re-examination of initial control areas, totaling 1,608,191 acres; estimate 50 percent of this acreage will need intensive reworking. As 75,808 acres have already been re-eradicated since 1922, only 728,287 acres will actually need to be reworked. Complete Ribes nigrum eradication throughout state - complete chemical eradication study - make additional studies to determine effectiveness of control - maintain Ribes free conditions in the environs of pine growing nurseries.

1875

The following is a list of the names of the persons who have been elected to the office of the President of the United States, from the year 1789 to the present time.

1789 George Washington

1793 John Adams

1797 Thomas Jefferson

1801 James Madison

1805 James Monroe

1817 James Monroe

1821 James Monroe

1825 James Monroe

1829 James Monroe

1833 James Monroe

1837 James Monroe

1841 James Monroe

1845 James Monroe

1849 James Monroe

1853 James Monroe

1857 James Monroe

1861 James Monroe

1865 James Monroe

1869 James Monroe

1873 James Monroe

1877 James Monroe

1881 James Monroe

1885 James Monroe

1889 James Monroe

1893 James Monroe

1897 James Monroe

1901 James Monroe

1905 James Monroe

1909 James Monroe

1913 James Monroe

1917 James Monroe

1921 James Monroe

1925 James Monroe

1929 James Monroe

1933 James Monroe

1937 James Monroe

1941 James Monroe

1945 James Monroe

1949 James Monroe

1953 James Monroe

1957 James Monroe

1961 James Monroe

1965 James Monroe

1969 James Monroe

1973 James Monroe

1977 James Monroe

1981 James Monroe

1985 James Monroe

1989 James Monroe

1993 James Monroe

1997 James Monroe

2001 James Monroe

2005 James Monroe

2009 James Monroe

2013 James Monroe

2017 James Monroe

2021 James Monroe

RHODE ISLAND

Policy: All control work performed by state scouts, as wild Ribes number less than one per acre and are very localized.

Acreage of pine: Pure, 13,779 acres; restocking of pine in types other than pine, 59,417 acres; total, 73,196 acres - also considerable acreage of potential pine land.

Cooperation: No cooperation solicited, except in 1918, 1923, and 1924, when eight individuals gave \$581.36 for conducting general control work in the state.

<u>Ribes eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled (Wild & Cult.)</u>	<u>Total Cost</u>	<u>Cost Per Acre</u>
(Initial and	1918-1921	103,261	85,493	\$16,761.55	\$.162
re-eradication)	1922-1929	180,331	121,251	13,811.74	.077
	Totals	283,592	206,744	\$30,573.29	\$.108

(Eradication cost based on total cost of state scouts - No wild Ribes eradication work performed during 1929.)

Cultivated Ribes destroyed: 1918-1921, 4251 bushes; 1922-1929, 7815 bushes; total for period 1918-1929, 12,067 bushes. (Does not include cultivated Ribes pulled in connection with black currant eradication project during 1929.)

Compensation - 1922-1929: Number persons paid compensation - 7; total number bushes paid for - 94; total amount paid in reimbursement - \$35.85.

Ribes re-eradication: The above acreage includes 10,910 acres reworked since 1922.

State forests: The one state forest (Goddard Park) has been protected.

Plantations: All plantations in control areas have been protected. The outside plantings are in little danger, due to scarcity of wild Ribes. However, these areas should be inspected. The amount of re-forestation is gradually increasing in this state.

Nursery sanitation: Only a few ornamental pines are grown in the Rhode Island nurseries. Such nurseries and environs have been inspected by state men - no pine infection has ever been found in these nurseries. Only one nursery grows cultivated Ribes for sale.

Ribes nigrum: A state law prohibits the possession of such bushes in the state. A survey to locate Ribes nigrum was completed in two towns in 1927. These bushes were eradicated in 1928. During 1929, all the control work was limited to the systematic eradication of Ribes nigrum. A total of 5703 Ribes nigrum and 906 other cultivated bushes were destroyed in 22 towns. (See Rhode Island 1929 State Annual Report for detailed data concerning this project.)

Blister rust surveys: A rough survey of white pine areas in state was made by Sheals in 1920. This information has been used for control and educational purposes. During 1926, a cartographical survey was completed of white pine and other types, Ribes and infection conditions.- These data summarized at Boston Office. A survey of the production of white pine and other woods in the state during 1925 was made by Anderson. Report prepared and published in News Letter. During 1928, Hurford began a survey to map the location of white pine and other forest types, and to estimate their contents. Two townships (Coventry and West Greenwich) were completed during 1928. Due to pressure of other work, this project was limited in 1929 to the field mapping of forest areas in the townships of North Providence, Lincoln, and Cumberland. A few towns were partially mapped.

Pine infection: Few spots, mostly from cultivated black currants - many of the infections have been cut out.

Investigations: Study of Ribes regrowth and effectiveness of control made by Anderson, report prepared by Anderson and Fivaz.

Office: Records of control work in good shape.

Future work: Complete initial protection of pine areas and potential pine land; estimate 250 acres needs to be worked. Re-examination of all control areas (283,592 acres) and eradication of Ribes in all likely sites such as; swamps, stream courses, fence rows, walls, cellarholes, and roadways. This check work in likely sites will take a four man crew at least two or three seasons - report on all control work in state - complete survey of forest types and an estimate of their contents - completion of Ribes nigrum project - maintenance of Ribes free conditions in environs of pine growing nurseries.

CONNECTICUT

Policy: In Litchfield County, where pine and Ribes are more or less generally distributed, cooperation is conducted with individuals and towns, foremen and scouts being furnished by the state. Outside Litchfield County, Ribes are comparatively few and localized; consequently, the control work is limited to scouting performed by state men.

Acreage of pine: Pure, 73,426 acres; mixed, 124,345 acres; pine restocking in types other than pine, 47,873 acres; total, 245,644 acres.

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>	<u>No. Town Appropriations</u>	<u>Town Money Appropriated</u>
	1918-1921	0	0	0	0
	1922-1929	424	\$8,006.83	15	\$7,701.38*
	Totals	424	\$8,006.83	15	\$7,701.38*

*Includes \$1,924.83 raised by individual subscription.

<u>Ribes Eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Wild</u>	<u>Cult.</u>	<u>Total Cost</u>	<u>Cost Per Acre</u>
(Initial and Re-eradication)	1918-1921	13,470	125,263	8	6,962.11	\$.517
	1922-1929	206,421	1,581,108	17,203	52,735.60	.255
	Totals	219,891	1,706,371	17,211	\$59,697.71	\$.271

(Eradication costs based on total cost of owner's labor, state labor, scouts, and foremen.)

Cultivated Ribes Compensation, 1922-1929: Number persons paid compensation - 4; total number bushes paid for - 61; total amount paid in reimbursement - \$27.25. No compensation paid prior to 1929.

Ribes Re-Eradication: The above acreage includes 19,103 acres reworked since 1924.

State forests: The state forests contain very little pine - protection work has been conducted where necessary.

Plantations: The plantations in the northern portion of the state are being worked in connection with the protection of native pine. The scattered plantings in the remainder of the state outside the natural pine range

are in comparatively little danger due to scarcity of wild Ribes. Many of these isolated plantings have been inspected, but very little follow up work has been done.

Nursery sanitation: During the fall of 1927, 158 owners of nurseries were interviewed regarding blister rust control. Sixteen owners, desiring to ship pine out of New England, agreed to cooperate in maintaining official control areas around their nurseries. A preliminary Ribes survey of these areas showed 70 Ribes owners, possessing 1014 cultivated bushes, would permit the destruction of the plants without compensation; and that 27 owners, having 567 bushes, were unwilling to cooperate. The attitudes of 28 additional owners of 342 bushes were not determined. As a result of the survey, control areas were established around eleven nurseries, and during 1928, 3962 acres were cleared of 60 wild Ribes, 93 Ribes nigrum, and 333 other cultivated bushes.

Such sanitation work was continued during 1929 in the environs of eleven nurseries, 5960 acres being cleared of 1182 wild and 1814 cultivated Ribes at a total cost of \$832.32. All of this work, except that on 380 acres, was re-eradicated. Only five nurseries intend to qualify under quarantine 63. Nine nurseries will continue to maintain the sanitation zones. During the fall of 1929, the state leader made a survey of nurseries, having or considering the sanitation zones, to ascertain their attitude towards state maintenance of these zones with the nurserymen contributing a substantial part of the cost. All were favorable to the plan and expressed their willingness to cooperate in amounts ranging from \$25 to \$100 annually. During 1928, pine infection was found in the Northeastern Forestry Co. nursery, and in 1929 in two additional nurseries.

Ribes nigrum: In July 1929, the Connecticut Legislature passed a bill prohibiting the planting, selling, or possession of Ribes nigrum in the state. A ^{systematic} survey to eradicate these bushes will be started in 1930.

Blister rust surveys: During 1920 and 1921, all pine areas in the commercial pine range were mapped on U.S.G.S. sheets, and an estimate made of their contents - data used as a basis for control work and for educational purposes. Epidemiology survey during 1926 of white pine and other types, Ribes and infection conditions - data summarized at Boston Office.

Infection: General in northern Litchfield County - only spot infections, mostly old cankers, in remainder of state.

Investigations: Ribes regrowth and effectiveness of control study by Endersbee, report prepared - crew experiment by Riley, preliminary report submitted - Studies made by Clark and Riley during 1929 to determine effectiveness of control and need for re-eradication - data summarized.

Office: Records and maps in excellent shape.

Future Work: Complete initial eradication, 25,600 acres, (Basis: estimates by state leader and agent of acreage still needing initial control work in each town.) - Re-examination of initial control areas (200,788 acres), estimate 50% will need to be reworked. A total of 19,103 acres have been re-eradicated since 1924. - Survey of Ribes nigrum and elimination of these bushes in state - Nursery sanitation measures applied to all nurseries growing white pine - complete inspection of all white pine plantations in state - additional studies to determine effectiveness of control work.

NEW YORK

Policy: Protection of white pine on state lands and on lands owned by individuals. State cooperates with such owners by furnishing, at state expense, foremen to supervise control work. In the future, control work on the state forest preserve will be restricted chiefly to pine areas of scenic importance; isolated pine areas of medium or old growth will not be protected.

Acreage of pine: Pure, 642,780 acres; mixed, 463,022 acres; pine restocking in types other than pine, 250,834 acres; total, 1,358,636 acres.
(Based on 1927 survey.)

<u>Cooperation:</u>	<u>Period</u>	<u>No. Individuals</u>	<u>Individual Expenditures</u>
	1918-1921	41	\$18,658.34
	1922-1929	3,791	119,350.56
	Totals	3,832	\$138,008.90

<u>Ribes Eradication:</u>	<u>Period</u>	<u>Acreage</u>	<u>Ribes Pulled</u>		<u>Total Cost</u>	<u>Cost Per Acre</u>
			<u>Wild</u>	<u>Cult.</u>		
(Initial and Re-eradication)	1918-1921	68,062	4,511,845	13,736	\$170,343.75	\$2.50
	1922-1929	411,257	10,045,507	25,295	353,732.21	.86
	Totals	479,319	14,557,352	39,031	\$524,075.96	\$1.09

(Eradication costs include total cost of owner's labor, state labor, foremen and scouts.)

Cultivated Ribes Compensation, 1922-1929: Number persons paid compensation - 597; total number bushes paid for - 3133; total amount paid in reimbursement - \$1183.81.

Ribes Re-eradication: Since the inauguration of the present program, re-eradication work has been performed only during 1928 and 1929 when 19,686 acres were cleared of 295,261 wild Ribes and 1492 cultivated bushes at a total cost of \$11,578.47.

State forests: Practically all of the control work prior to 1922 was on state lands; however, since then the amount of work on private lands has greatly exceeded the state projects. Initial control work has been completed on most of state pine areas worth protecting, except on such new purchases as the Tongue Mountain tract.

Plantations: The New York State nurseries have distributed, up to and including 1929, 56,458,488 white pines for planting in the state. Many of these plantings have been protected, especially in the agents' districts, but in other parts of the state no such control work has been done, except that by Agent Baker during 1929 in 5 counties in the northwestern part of the state. New York requires all prospective planters to sign an agreement, guaranteeing to eradicate all *Ribes* from pine planting sites. On November 1, 1929, there were 32,647,000 white pine seedlings and transplants in the five nurseries of the New York Conservation Department.

Nursery sanitation: During the past several years, sanitation measures have been applied to protect the pine areas in the state nurseries. The protection zones were for some time maintained at 900 feet. During 1928, this distance was increased to 1500 for all *Ribes*, except *nigrum*, which was eradicated within one mile of the pine areas. To date, *Ribes nigrum* have been eradicated from within one mile of each of the five state nurseries. The 900 foot *Ribes* free zones have been completely extended to 1500 feet around three of these nurseries and partially finished around the other two. The environs of the latter consists chiefly of dense brush types, containing an abundance of wild *Ribes*. All of the sanitation work in 1929 was confined to state nurseries.

In addition to the state nurseries, there are 300 commercial nurseries in New York. However, only a few of these grow any appreciable amount of white pine. During 1928, the first attempt was made to establish protection zones surrounding some of these nurseries, particularly in Wayne and Westchester Counties. It soon became apparent that cultivated *Ribes* were extremely abundant in the vicinity of the various nurseries. As compensation had to be paid for such bushes destroyed, it was evident the work would have to be limited. Therefore, it was restricted to a general survey to determine and record *Ribes* conditions in the environs of the nurseries in these counties and to the eradication of *Ribes nigrum* in such situations. According to the revised state blister rust law, effective February 17, 1930, no compensation shall be paid by the state for any species of *Ribes* destroyed in connection with the establishment of *Ribes* free zones around commercial nurseries, but fair compensation for such bushes must be paid by the person owning or operating the protected nursery.

Ribes nigrum: The New York state law prohibits the possession of such bushes. A systematic survey to eradicate *Ribes nigrum* was started in 1928. This work was chiefly confined to control areas and to nursery growing sections, and resulted in 3825 black currants and 439 flowering currants being destroyed,

not including bushes eradicated in connection with the regular control work. In Westchester County alone, 3313 *Ribes nigrum* were uprooted, and the survey completed in all but six towns. During 1929, black currant eradication was conducted as a special project in 47 towns in 11 counties. A total of 4048 *Ribes nigrum* and 322 flowering currants were destroyed, exclusive of the black currants eradicated in connection with the regular control work. The revised blister rust law does not include flowering currants as one of the prohibited black currants.

Blister rust surveys: Strip line infection survey made by Brooks in 1920 - The pines on rod wide strips, totalling 28.4 miles in length, were examined; a total of 12,297 pines were inspected, and 5.1 percent found diseased; 16 plots, totalling 15.1 acres, were laid out adjacent to the strips. 17.5% of the 14,455 pines in these plots were diseased. In 1922, Fivaz made a similar strip study near Warrensburg of 12.1 miles in length and found 21% of the 8139 pines infected. During 1920 and 1921, Amadon made survey of white pine in parts of Essex and Warren Counties - the pine areas have been designated on U.S.G.S. maps, but no summary has been made of acreage or contents of the stands - maps used as basis for control work. During the period 1927 to 1929, McIntyre had rough maps made of the pine and hardwoods types in several counties for use in eradication work. Cartographical survey made by agents and Corliss, during 1926 and 1927, of white pine and other forest types, *Ribes*, and infection conditions - maps and summaries prepared at Boston Office.

Infection: General and abundant in commercial white pine range of the state, spot infections in other parts, caused principally by infected stock or *Ribes nigrum*. In generally infected region, on a basis of town units, the percent of diseased pine ranges from 1-30 percent of the total amount of pine. Also, see strip line data under "Surveys".

Investigations: Selective *Ribes* eradication experiment at North Hudson - not completed - no report. Effectiveness of control study made by Fivaz - preliminary report only. Blister rust damage studies by York and Snell - published in Journal of Forestry. *Ribes* ecology studies by Littlefield and Fivaz - preliminary report given at annual conference 1927. Damage study of pine plantation at Schroon River - preliminary report prepared by Ford. During 1928, the pines were examined for infection in 30 plots (each approximately one acre in size) 15 of the plots being laid out in areas cleared of *Ribes* prior to 1925, and the other 15 in tracts not eradicated of such bushes in the same towns. The study showed that since the time of eradication, over 15 times as much infection has originated in the unprotected tracts, as in the protected areas. During 1929, nine additional pairs of comparable plots were examined by the agents and the data summarized at the Boston Office.

Office: Records and maps in good shape.

Future Work: Complete initial eradication work on state and individually owned lands - 468,816 acres in agents' districts (basis: estimates made by agents of acreage still needing initial eradication work in each town, including both pine areas and protection strips). In addition, there are 132,301 acres (mostly plantations and mixed growth) outside of the agents' districts, which will require Ribes eradication. Re-examination of 459,633 acres of initial control work - estimate 50% will have to be reworked - as 19,686 acres have been re-examined since 1928, a total of 210,130 acres will require intensive crew work. Elimination of Ribes nigrum throughout the state - application of adequate sanitation measures surrounding all nurseries growing white pine - Inspection of pine plantations and application of control measures - Complete recheck of Amadon's pine survey in Warren and Essex Counties.

NEW JERSEY

Policy: Prior to 1929, all blister rust activities in this state were conducted by a few temporary men, employed during the summer months, on scout work to determine pine, Ribes and infection conditions. Since August, 1929, a permanent agent has been employed on a part time basis. Due to the limited amount of native white pine, his activities are confined chiefly to nursery sanitation, black currant eradication, inspection and protection of plantations, scouting, and direction of control work where needed.

Acreage of white pine: From a forestry viewpoint, there is very little white pine in the state; however, it has been planted extensively as an ornamental, especially in the Red Bank and Morristown sections. In Passaic County, a light stocking (less than 20 percent) of native white pine is found in hardwood types in the Greenwood Lake section, on Bearfoot Mountain, and near West Milford. At the last place, there is almost a pure stand of white pine comprising several acres. Also, in Sussex County, a light stocking of white pine exists on Waywayonda Mountain (from Vernon north to the state line), Pochuck Mountain, Sparta Mountain, Kittating Mountain, and around Crancerry Lake. It is most abundant in the township of Montague. In Warren County, there is also a light stocking along the Delaware between Columbia and Manunka Chunk.

Cooperation and Ribes eradication: Many owners destroyed their Ribes nigrum; also there is an unwritten agreement between the New Jersey nurseries not to sell these bushes. Wild Ribes are known to exist in the northern part of the state, particularly on Waywayonda Mountain and near West Milford, where Ribes rotundifolium and americanum have been found. The location of the wild Ribes in relation to valuable pine areas is such that the destruction of these bushes does not appear urgent.

State forests: 6 forests, comprising 18,954 acres, apparently contain little white pine of commercial importance.

Plantations: About 10,000 acres have been planted; however, the white pine survey shows only an estimated total of 194,840 planted white pines, exclusive of 21,388 reported in nurseries. The largest white pine plantings are located in Gloucester, Morris, Cumberland, Ocean, and Somerset Counties. Smaller white pine plantings are found in the Counties of Monmouth, Warren, Burlington, and Sussex. There is one state nursery of about ten acres in size - no information as to sani-

tation measures. During 1929, an inspection was made of the sites and environs of the white pine plantings made from stock distributed during that year by the State Department of Conservation and Development. These locations were examined for wild and cultivated Ribes, and when Ribes and older pines were found nearby, these were inspected for infection. Owners, in each case, were advised regarding the disease and control methods. The plantations varied from 500 to 10,000 seedlings, and on 30 sites examined, 323 cultivated currants and gooseberries (mostly red currants) were located - none of these bushes were infected. Card and map records of this work were kept for future reference.

Ribes nigrum: Survey of black currants made during 1928 in Morris County, also in parts of Monmouth and Sussex; 102 plantations of black currants were located in Morris County, 19 in Monmouth, 10 in Sussex, 1 in Warren, and 1 in Passaic Counties. In the area scouted, black currants were found in only one nursery.

Investigations: General scouting to locate pine, Ribes, and infection conducted during summer months by one or two cooperative scouts - state wide survey of forest types, by towns, made by Hirt during 1927 - this detailed data have not as yet been summarized.

Infection: First found in New Jersey in 1911 on pines at the Newark watershed near Charlotteburg. Since then, infection has been found somewhere in the state every year with exceptions of 1912, 1914, 1915, 1923 and 1929. Scouting in 1927 showed the disease more generally prevalent than ever before, being found on Ribes in 21 localities in seven counties. No pine infection has been reported since 1918.

Future work: Application of adequate nursery sanitation measures - complete survey of Ribes nigrum and eradication of such bushes - eradication of all Ribes within at least 900 feet of pine plantations and ornamental pine of value - additional scouting in northern section of state to determine, in more detail, pine, Ribes, and infection conditions - adequate records and maps to show location of pine plantations, Ribes nigrum, native pine, infection, etc. - general educational work to keep public informed of the disease and its control.

PENNSYLVANIA

Policy: Prior to 1929, the work was limited chiefly to scouting for pine, Ribes, and infection during the summer months by one or two temporary men employed cooperatively by the State and Federal Departments of Agriculture. The first demonstrations of control methods were held during 1928 by the Department of Forests and Waters in cooperation with the Office of Blister Rust Control. In 1929, the work was definitely organized on the following cooperative basis: The State Department of Agriculture agreed to assume administrative direction of cooperative employees, conduct such control activities as agreed upon each year by the cooperating parties, and to enforce state laws under which blister rust control is conducted. The Department of Forests and Waters agreed to undertake the application of local control measures on state owned forests; cooperate with counties, towns, associations, and individuals in the application of local control measures; provide supervision and checking of such work. Control activities were restricted almost entirely to state owned lands during 1929. In 1930, it is expected that the Department of Forests and Waters will assume the responsibility of directing all control activities in the state.

Acreage of white pine: Pure, 91,897 acres; Mixed, 126,101 acres; pine restocking in types other than white pine, 157,630 acres; Total, 375,628 acres. In addition, there is a vast unestimated acreage containing less than 20 percent pine stocking in mixture with other species. These figures are based on the 1927 cartographical survey. Over 41 million white pines have been distributed from the state nurseries since 1903. In 1922, a survey^{was made} of white pine stands in Wayne and Susquehanna Counties.

Cooperation and Ribes Eradication: Prior to 1928, control work in Pennsylvania had been limited to eradication of Ribes in the environs of the Clearfield State Nursery. This control project was begun in 1924. Three additional eradication jobs were conducted, during 1928, at Sinnamanoning, Cameron County; at Potters Mills, Centre County, on the Pennsylvania State Forest; and at Damascus, Wayne County, on private land. These projects were primarily for demonstration purposes and were attended by private individuals and members of the Pennsylvania Department of Forests and Waters and the Office of Blister Rust Control. A small amount of Ribes eradication was also performed around pine plantations on the Fox Estate in Clarion County. During 1929, 23 Ribes eradication projects were conducted in eight state forest districts. A total of 4,877 acres were cleared of 305,583 Ribes at a cost of \$3,348.96. In addition, cooperative work with individuals resulted in 1,100 wild Ribes and 520 cultivated bushes being eradicated at a cost of \$170 to the owners and \$39 to the state. This work on state and private lands was supervised by the district foresters who were assisted by L. W. Hodgkins of the federal office in organizing and training the

field personnel. The white pines at Hearts Content, on the Allegheny National Forest, were also protected by the Forest Service in cooperation with the Bureau of Plant Industry. A total of 461 acres were cleared of 23,020 wild Ribes and 8 cultivated bushes at a cost of \$198.30.

Public Forests: In 1926, the 21 state forests totalled 1,131,783 acres.

There are also two national forests, the Allegheny and the Tobyhanna. Apparently, the amount of native white pine on these forests is rather limited. However, over 21 million white pines have been planted on the state forests since 1903. The Hearts Content tract, comprising 461 acres on the Allegheny National Forest, was initially cleared of Ribes during 1929. Also, 23 eradication projects were conducted in eight state forest districts. A total of 4,877 acres of state land was eradicated of 305,583 Ribes at a cost of \$3,348.96.

Plantations: Since 1903, the six state nurseries have distributed to individuals nearly 20 million white pines. In addition, these nurseries have supplied over 21 million white pines for planting on the state forests. A complete record of all these plantings is on file at the office of the Department of Forests and Waters. An examination of many of the plantings during 1928 and 1929 resulted in the blister rust being found on pines in several of the areas. During 1929, several of these infected plantations on state land were cleared of Ribes. When the disease has been located in private plantings, the owners have been fully informed regarding conditions.

Nursery Sanitation: This work has been restricted to the Clearfield state nursery. Ribes eradication was first conducted here in 1924. In 1926, a re-eradication was made for a distance of 900 feet surrounding the nursery. The area was again reworked in 1928, and this work included all white pine plantations in the vicinity of the nursery and for a distance of 900 feet beyond the plantations. This area originally numbered about 500 Ribes per acre. A re-eradication will be made during 1930 to remove the few existing bushes. No nursery sanitation work was performed in 1929. During 1930, adequate sanitation measures will be applied to all the state nurseries to insure the production of disease free stock. The amount of white pine grown in commercial nurseries is very limited and used entirely for ornamental purposes. Practically all of these commercial nurseries are located in open situations where wild Ribes are absent or very scarce.

Ribes nigrum: Cultivated Ribes survey made in Wayne County in 1925 - 279 black currants being found. General scouting and the school campaign show Ribes nigrum planted in most sections of the state, but these bushes are apparently not very numerous. During 1929, a few black currants were eradicated on private lands adjoining state forests which were cleared of wild Ribes.

Blister rust surveys and infection: It has recently been reported that Samuel N. Baxter of Philadelphia found infected pines in a Philadelphia nursery during April, 1905. This report, corroborated by the U. S. Department of Agriculture, is the earliest known record of the disease in this country. A state nursery inspector states that blister rust was found at another nursery near Philadelphia in 1910 or 1911. Infected pines were located by J. F. Collins, during 1909, in a plantation at Lewistown Junction. The disease was reported almost yearly thereafter in various counties and frequently noticed on planted foreign stock. Between 1903 and 1910, nearly a half million white pine seedlings were imported into Pennsylvania from European nurseries.

The cultivated Ribes survey in Wayne County, during 1925, resulted in the location of 2,051 cultivated Ribes. Of these, 279 were black currants, 1,496 prickly gooseberries, 250 cultivated gooseberries, and 26 ornamental Ribes - Sixty-two gardens contained black currants - Blister rust was found at Calicoon on pines and black currants, at Rileysville on black currants, at Damascus on pines and wild Ribes, and at Laurella on black currants. The infection at Laurella is a new location, the rust being found previous years in the other places.

During 1926, scouting was performed in four northern counties, the rust being found on Ribes nigrum (2 bushes in each case) in the counties of Monroe, Pike, Wyoming, and Lackawana. In Brooklyn, infected wild Ribes were located.

During 1927, a cooperative school survey to locate the rust was made in 57 counties - 14,000 packets (each containing instructions to the teacher, a sheet of information, colored illustrations, ten small envelopes for specimens, a return envelope, and a report form) were sent to each school outside Pittsburg and Philadelphia. In the 53 counties reporting; returns were received from 1,716 schools. These schools reported that 13,061 gardens had been examined, and 253 of these schools sent in 465 envelopes containing specimens infected with blister rust. The rust findings are distributed over 37 counties, and the area so affected extends nearly to the Ohio border on the west, on the south to the Maryland line. Since the number of envelopes submitted was 7,123, the percentage containing blister rust was 6.5%; similarly, the percentage of schools reporting rust was 14.7%. Additional reports were received during 1928 from 50 schools in 7 different counties covering the examination of 365 gardens. These additional 1928 reports contained only one specimen of blister rust.

General scouting in 1927 revealed the presence of the rust in five additional counties (Bucks, Monroe, Luzerne, Columbia, and Clarion); all of these, except Monroe, were new counties for the rust. At Clarion, a stand of pine reproduction was found to be quite heavily infected with young cankers.

In 1928, a somewhat similar infection survey was conducted by utilizing the fire warden personnel (4100 men) of the Department of Forests and Waters. Reports were received from 171 or 4 percent, of the 4100 wardens, scattered over 50 of the 53 counties in the state. These men examined 3,550 Ribes in 501 locations. A total of 91 wardens submitted 269 Ribes specimens, 14 of which were infected with the rust.

A check was also made during 1928 in 28 of the 37 counties where infected Ribes were located by the 1927 school survey. In the course of this work, a scout visited the vicinity of 144 schools which reported the rust in 1927. As a result, the disease was found again near 49 of these schools. The scout examined the Ribes in 204 gardens, and found infected bushes in 64.

During 1928, some additional scouting was also done by federal and state men. As a result of all surveys and scout work in 1927 and 1928, the blister rust was found on Ribes in 43 counties, and on pine in nine locations, scattered over six counties as follows: Cameron, 1; Clarion, 1; Clinton, 1; Lycoming, 1; Potter, 2; Wayne, 3. In three areas, the damage to young pine was severe, while in others, the rust was in its initial stage. Up to and including 1928, pine infections were known to have been present in ten counties of Pennsylvania.

Scouting was conducted by two temporary agents during the summer months of 1929 to determine the amount of infection on Ribes in the southern half of the state from the western edge of the Alleghenies east to the New Jersey border. A total of 31 counties were visited and 932 locations, containing 13402 Ribes, were examined. Only 14 bushes (all Ribes nigrum) in 7 locations were found diseased. In addition, a Ribes infection survey was made by the Department of Forests and Waters through their field personnel, numbering about 150 men. In this survey, 296 locations were examined for Ribes infection in 38 counties; the number of plants totalling 4,030. Blister rust was found in 15 locations in 11 counties, in all of which infection had been previously located. The results of these two surveys indicated that infection was exceptionally light on Ribes during 1929, probably due to the extended period of drought. In the general scouting carried on by Hodgkins in cooperation with Clepper and the district foresters in 17 forest districts, pine infection was found in 16 districts comprising 21 counties, in some of which the rust had been previously reported. Up to 1929, inclusive, the disease had been located on pines in 27 of the 67 counties in the state. The rust is known to be present in the state from the New York border on the north to the Maryland border on the south. It exists in the counties along the Delaware River on the east, and extends across the state westward nearly to the Ohio line. Generally speaking, the earliest infections on natural pine occur in the northern tier of counties, from whence the disease has spread south.

MICHIGAN

Policy: Prior to 1927, blister rust work was restricted to a limited amount of scouting for infection on Ribes and pine by temporary employees during the summer months. In 1927, a permanent agent was assigned to take charge of all blister rust control activities in the state. However, no control work was conducted prior to 1928. During that year, Ribes eradication was begun in one town by means of a town appropriation and some individual cooperation. The state legislature established a definite blister rust control law in 1929 and made an appropriation of \$20,000 for control work. As a result, the 1929 activities included all the various phases of control work. An additional permanent agent was appointed during the latter part of the year.

Pine acreage: Most of the white pine in Michigan is located in the upper half of the lower peninsula. The cartographical survey of 1928 showed pine conditions as follows: pure pine, 28,321 acres; mixed, 685,789 acres; pine restocking in types other than pure and mixed white pine types, 122,769 acres; total 836,879 acres. In addition, there is a considerable acreage of mixed growth which contains less than 20 percent pine stocking.

Cooperation and Ribes eradication: During 1928, a total of 1400 acres in the town of Tuscarora were cleared of 82,779 wild Ribes and 187 cultivated bushes at a cost of \$217.72 to the state and \$485.60 to the town. In addition, 100 acres were worked in cooperation with 8 individual owners; 9 wild Ribes and 76 cultivated bushes being destroyed at a cost of \$30.00 to individuals and \$6.00 to the state. In 1929, cooperative work in two towns resulted in 400 acres being eradicated of 51,089 wild Ribes at a cost of \$365.69 to the state and \$199.50 to the towns. In addition, the state cleared 119,893 wild Ribes from 2170 acres of public lands (including three public nurseries) at a total cost of \$2,663.47 to the State and \$373.97 to the Government.

Public forests: In 1926, seventy-eight state forests contained 333,000 acres; two National Forests comprised 127,000 acres - no information is available as to amount of white pine in these tracts.

Plantations: Up to 1925, about 25,400 acres had been planted, but no

information is available as to how much of this is white pine. The cartographical survey of 1928 secured partial information on white pine plantings. These data showed 4,846 acres had been planted to white pine.

Nursery Sanitation: During the past few years, annual inspections have been made of pines and Ribes in many of the nurseries. This work by the State Department of Agriculture resulted in the destruction of a large number of black currants by the nurserymen. No complete records of this work are available. The blister rust law passed in 1929 prohibited the possession of the European black currants in the state and also provided for the establishment of control areas. Before the passage of this law, the Commissioner of Agriculture had set aside, by special promulgation, the three principal public nurseries as blister rust control areas. Due to lack of funds, no sanitation work was conducted until 1929, when these three nurseries and environs were eradicated of all currants and gooseberries. Cultivated black currants were also destroyed within a mile radius of each of these nurseries.

Ribes nigrum: A regulation issued by the Commissioner of Agriculture in 1928 prohibited the possession of Ribes nigrum in counties where infection had been found. The blister rust law enacted in 1929 prohibits the possession of such bushes anywhere in the state. During 1928, a sample black currant survey was conducted in Sheridan Township, Clare County, for the purpose of estimating the time and expense necessary to carry on a general state wide black currant eradication program. The project started as a black currant survey, but developed into one covering all cultivated Ribes. Out of a total of 213 farms in the township, 80 had cultivated bushes as follows: 424 red currants, 215 gooseberries, 121 flowering currants, and 90 black currants - total, 850 bushes. It took one man five days to make the survey. He traveled 166 miles, interviewed 210 persons, at a total cost of \$56.76. During 1929, systematic eradication of cultivated black currants was begun on a county-wide scale. Five lower peninsula counties (Cheboygan, Roscommon, Missaukee, Newaygo, and Montcalm) were completed, and the larger portion of two upper peninsula counties (Marquette and Gogebic) was also canvassed. As a result, 5,194 Ribes nigrum were destroyed at a total cost of \$6,000.87 to the State and \$451.77 to the Government.

Blister rust infection: General scouting for infection has been conducted during the past several summers. However, it was not until 1927 that the disease found to be general on Ribes nigrum in the southern peninsula. The disease was first found in 1916 on imported pines in an Oakland County nursery.- More infections were located

in Oakland County during 1918, 1919, and 1922. - Also, infections were found in Kent County in the western part of state during 1922 and 1923.- Most of these infections were primary and occurred on imported seedlings. No additional infections were located from then until 1927. During that year, Ribes infections were found in 56 locations in 18 counties.- Scouting of about 7,000 acres of pine in St. Clair, Sanilac, Macomb, Clare, and Midland Counties did not reveal any infection.

Infected native white pines were found for the first time in Michigan, during 1928, at Indian River, Tuscarora Township, Cheboygan County. The infected trees numbered about ten. No other diseased pine were located in 1928.

A survey to determine the extent of Ribes infection was conducted in cooperation with the schools during 1928. As a result, infected Ribes were located for the first time in five counties in the upper peninsula. In addition, the survey revealed infected Ribes in nine counties in the lower peninsula; five of this number being new situations, and four where infection had been located in 1927. General scouting by the blister rust agent showed Ribes infection in three additional counties on the southern peninsula. Thus, up to 1929, the rust had been found on Ribes in 31 counties and on native pine in Cheboygan County.

The Ribes infection survey in cooperation with the schools was continued during 1929. It resulted in the disease being found in four new places in two additional counties (Delta and Grand Traverse). Diseased Ribes leaves were also sent in from nine locations in three other counties where infection had previously been reported. General scouting by state and federal employees revealed infection on native pine in Marquette and Dickinson Counties. This scouting work also resulted in diseased Ribes being found in Delta County and in six other counties where the rust had previously been located. Up to 1930, the disease had been reported on Ribes in 33 counties and on native pine in three counties.

Cartographical survey: This survey to determine the location and amount of white pine and other forest types in the entire state was completed during 1929. General information was also secured on Ribes species.

Future work: Establish definite control program with adequate personnel - application of adequate nursery sanitation measures - complete eradication of Ribes nigrum in state - follow-up survey to inspect and map pine areas as determined by cartographical survey - general scouting to determine infection conditions - protection of all native and planted pine on public forests and on areas owned by individuals.

WISCONSIN

Policy: State blister rust control appropriations of \$7500 annually were made available during the fiscal years 1918 to 1920. The amount was reduced to \$4000 annually during the fiscal years 1921 to 1923. Since that time, no state appropriations have been made for blister rust control. However, a limited amount of such work has been performed since 1923 through funds derived from other state sources and from assistance given by a few individual cooperators. The control work prior to 1924 consisted of local eradication of Ribes to protect pine areas and the destruction of infected pines to prevent the spread of the rust. Except for a small amount of individual cooperation, all this work was performed by state men. The control work in Wisconsin has been supervised by a permanent agent. However, during the past few years, he has been used chiefly on special assignments such as transit inspection experimental work at the Eau Galle demonstration area, scouting, etc. It is expected that a definite control program will soon be adopted, supported by adequate appropriations and carried out under the direction of a permanent state leader.

Acreage of pine: Pure, 11,127 acres; mixed, 109,756 acres; total, 120,883 acres. There is also a considerable acreage of mixed growth containing white pine stocking of less than 20 percent. Very little restocking of white pine is occurring in any of the types, due in part to grazing, fire, and settlement. Of the total pure pine, 3,092 acres are in the three counties of Shawano, Oneida, and Vilas. Native white pine (pure and mixed) is found in 33 counties, pure stands being present in only nine. Nineteen additional counties have pine plantations only.

Cooperation: During 1920-1923, 112 individuals expended \$2,855.24. This amount includes some money spent by the Indian Service and Conservation Commission. In 1926, the Indian Service had its men eradicate the Ribes from 250 acres, and during 1927, one owner re-eradicated Ribes on his property of 50 acres. In 1928, 5 owners expended a total of \$21.00 assisting in control work, and one additional owner, working alone, cleared 7 acres of Ribes.

Ribes Eradication: During the experimental control work, 1916 to 1921, 20,647 acres were eradicated of 1,288,919 wild Ribes and 19 cultivated bushes at a cost of \$8,341.99. These total figures, however, include 403 acres eradicated of 21,725 wild Ribes during 1916 and 1917 for which no cost data are available. Since 1921, a total of 9,891 acres have been cleared of 950,850 Ribes at a cost of \$8,266.16. Since 1921, there has been no state appropriation money available for blister rust

control. Therefore, such work has been very limited. None was performed during 1924 and 1925, and only a small amount in subsequent years.

Pine eradication: An attempt was made over a series of years to check the spread of the disease by eradicating infected pines as soon as they were discovered. The work of destroying infected trees and in some cases entire stands was conducted, during the period 1916 to 1922, in 17 areas comprising 1,000 acres. In 1916, 5,615 pines were cut on 213 acres at Lake Waupogasset. During 1918, 500 pines were destroyed on 80 acres at Lewis, and 2,405 pines were pruned at Grantsburg. Over 30,000 board feet of white pine were cut on the forest area in 1920.

Public forests: Initial control work completed at Interstate Park, also on most of the pine lands of the Indian Reservation near Keshina - no other data available. In 1926, the state owned 173,000 acres of state forests. These apparently do not contain much white pine.

Plantations: Most of the planting has been done during the last five years - According to the 1927 cartographical survey, 1,262 acres have been planted to white pine in 33 counties. No information available as to protection of these plantations.

Nursery sanitation: In 1925, the state had one small nursery; however, the state output of seedlings has been greatly increased since that time. The pines and Ribes in private nurseries have been inspected annually, but no infection has been found - no information available as to other nursery sanitation measures.

Ribes nigrum: No black currant law or systematic effort to eradicate such Ribes.

Blister rust surveys and investigations: For several years, Ninman with some assistance, has done considerable scouting throughout the state, and has roughly marked on maps the location of many pine areas and infection. During 1927, Ninman secured data on forest types for the entire state. This information has been summarized at the Boston Office, and will be used in connection with the epidemiology study. During 1922-1929, experiments in Ribes eradication and ecology have been conducted at Eau Galle. The field data have been summarized, and a preliminary report submitted. The following is a brief summary prepared by Mr. Ninman of the research work carried on at Eau Galle, Wisconsin:

"Since 1922, nine projects have been undertaken and the results of some of them have been useful in Ribes eradication for several years.

The projects which have been completed and of which the results have been written in nearly completed form are as follows:

1. Straight Eradication; which deals with the time required per acre as affected by number of bushes, per acre, size of bushes, contour of the area, and brush density thereon.
2. Reestablishment of Ribes by sprouts from root parts left in the ground.
3. Disposal of uprooted Ribes bushes.
4. Relative merits of different trail markings.
5. Effect of grazing on white pine reproduction.

One project, relative effectiveness of hand pulling and pick pulling as a means of uprooting Ribes, has not as yet been written up in its complete form although the work has been completed.

Projects, which are still in progress and of which the results have been summarized or written up in a preliminary form so that they are available for use so far as the work has progressed are as follows:

1. Ribes seed beds in which it is the intention to determine the maximum, minimum and optimum depth at which Ribes seeds germinate and grow best in well cultivated soil; the mortality of Ribes seedlings on cultivated ground; the rapidity of growth of Ribes seedlings on cultivated ground; and the age at which Ribes produce seeds if seedlings are started on cultivated ground.

2. Second Eradication. In this study, the objects are -

- (a) to determine what percentage of the number of Ribes bushes is ordinarily eradicated by a crew the first time over, and what percentage of the leaf surface is destroyed the first time over;
- (b) to determine whether it is possible to eradicate every Ribes bush, or what per cent of the number of Ribes bushes, in any one year by a succession of eradications the same year;
- (c) to determine whether all Ribes bushes can be eradicated if one eradication is made for a period of years;

- (d) to determine how many years after the first eradication it is advisable to make a second eradication in order to protect white pine from the blister rust;
- (e) to determine the extent to which Ribes seedlings influence the amount of live stem which appears after the first eradication.

A summary and first draft have recently been prepared of this set of experiments. Data are to be collected until 1932 inclusive.

3. Ecological studies. This set of experiments deals with the growth of Ribes in relation to their environment, chiefly as affected by shade conditions. In the studies are included the effects on Ribes of all sizes, including seedlings, with respect to age, height, amount of live stem, number of leaves, number of berries, average annual growth, the annual amount of dead stem of the canes, the mortality, and the appearance and growth of seedlings. A carefully checked tabulation of the data for the years 1922 to 1929 has been made, and a checked summary of the data is nearly completed. It is the intention to prepare a preliminary written report by May 1, 1929. The data on this set of experiments is very voluminous. Most of the work on large Ribes bushes was completed in 1929, but on the remainder, especially with respect to the growth, mortality, etc., of the seedlings appearing since 1922, is to be continued until 1932, inclusive.

Besides the major objects for which the projects are intended, much information with respect to the growth of the different species of Ribes under various conditions is secured incidentally."

Infection: First discovered on pine in Polk County in 1916 - has been found since on scattered areas in the counties of St. Croix, Polk, Barron, Dunn, Pepin, Washburn, Rusk, and Eau Claire in the west central part of the state, and in Marathon, Waupaca, and Shawano Counties in the east central portion. The infected pine in many of these areas have been destroyed in an effort to prevent the spread of the disease. However, there still exists 13 known infection centers in five counties. Spot infections could probably be located in other parts of the state.

Future Work: Adoption of a definite control program, supported by adequate appropriations and carried out under the direction of a permanent state leader. Control activities should include: adequate nursery sanitation to insure clean planting stock - protection of all pine plantations - eradication of all Ribes nigrum - complete initial eradication of Ribes to protect native stands, at least 132,833 acres (basis: pine acreage (pure and mixed) plus additional 1/3 acreage for protection strips minus acreage cleared of Ribes) - re-examination of present control areas containing 28,833 acres, estimate all this acreage will need to be reworked because of abundance of Ribes found originally - complete Eau Claire experiment and prepare final report - extensive scouting to determine present status of disease - preparation of a detailed state map showing location of pine areas, infections, etc.

MINNESOTA

Policy: An effort was made during 1917 to 1919 to eradicate blister rust from the state by the destruction of Ribes and diseased pine in the known infection areas. Late in 1919, the futility of entirely eradicating the disease was realized. From then until 1922, the limited amount of control work was confined to protection of pine areas by the local eradication of Ribes. Since 1923, the work has been restricted to cooperative scouting and studies of blister rust damage and Ribes regrowth by one or two men employed temporarily during the summer months. During 1929, a permanent state leader was appointed to take charge of all blister rust activities in the state, and a blister rust control law was enacted by the state legislature. A definite program and plan of work has been cooperatively developed and approved by the various agencies. A state appropriation for control work will be requested at the next session of the legislature. Under the general plan of work, the state will aid pine owners on blister rust control by providing trained men to supervise the eradication of Ribes, but the cost of the actual eradication work will be paid by the owners.

Pine acreage: (Based on survey figures of 1928). Pure pine, 173,092 acres; mixed pine, 266,812 acres; pine restocking in types other than white pine, 170,524 acres; total, 610,428 acres. There is also a considerable acreage of mixed growth, which contains less than 20 percent of pine stocking. The natural pine range in Minnesota is north of a line drawn from southern Washington County to the southwestern corner of Kittson County in the extreme northwestern part of the state.

Cooperation: During 1921 and 1922, eleven individuals expended \$154.30 on control work.

Ribes eradication: During 1918 to 1923, inclusive, 4,981 acres were cleared of 407,278 wild Ribes at a cost of \$14,180.17, or \$2.85 per acre - Ribes averaged 81.8 bushes per acre. Only 118 cultivated bushes have been eradicated. No Ribes eradication work has been performed in the state since 1923.

Public forests: The National Forests in Minnesota during 1925 comprised 1,047,941 acres, while state forests had an acreage of 350,000 acres. Considerable white pine, mostly of merchantable size, is known to exist on the National forests. No protection work has been done on these public forests. However, Ribes eradication work was conducted in the Interstate Park during the period 1918 to 1920.

Plantations: According to the Forestry Almanac, up to 1927, a total of 375,000 trees had been planted on farm forests and as demonstration projects, no records available as to how many of these trees were white pines.

Nursery sanitation: Yearly inspection made of Ribes and pines in state and private nurseries - no information as to other protective measures.

Ribes nigrum: No action has been taken regarding the eradication of this species - The new state policy is to eradicate Ribes nigrum within one mile of valuable white pine. A special survey of black currant conditions was made during 1929 in Duluth and Two Harbors. This work in Duluth resulted in the location of 233 patches containing 1,272 black currants, while in Two Harbors 39 plantings were found to have 160 Ribes nigrum. In the former town, 62 percent of the Ribes were diseased; but in the latter, only one percent were infected.

Blister rust investigations: 21 permanent pine infection plots established, by state men, in older infection areas to study development of disease. An examination of 2,211 pines in these plots during 1927 showed 9.3 percent were infected. Also, 21 Ribes regrowth plots - summary of conditions in these plots given in state annual report for 1927. Control measures by local eradication of Ribes in 1918 and 1919 were effective in controlling pine infections. The Ribes regrowth, however, was such as to warrant re-eradication five years after the original work. Wild Ribes are widely distributed wherever pine occurs. Ribes cynosbati is most prevalent and very susceptible to the rust. Considerable scouting for pine and infection has been performed by Lindgren; this work is also reported in 1927 annual report. During 1927 and 1928, Hirt completed a survey of forest types in the state, as a basis for the epidemiology study. In 1928, the Ribes return plots and the pine infection plots were rechecked. These plots were re-examined in 1929. A summary of conditions is given in the Minnesota Annual Report for 1929.

Infection: Blister rust was first found in Minnesota during 1916 on pine in a nursery near St. Croix. Later in that year, Ribes infection was located in three areas near Taylors Falls, and another pine infection was found forty miles south of Taylors Falls. Nine new infections were located in 1917, five in 1918, and four in 1919. Since then blister rust has been slowly but steadily spreading north and west. However, the few importations of infected stock, the early control work, and scattered distribution of the pine, have retarded the rate of spread. At the present time, blister rust is known to be present in 13 counties; occurring on nursery stock in different places in the southern part of the state almost to the Iowa line. On native pine and Ribes, the most

southern infections are found in Washington County. The rust occurs in every county along the Wisconsin line from Washington north to Lake County. The western limit is Morrison County; and the northern, St. Louis County (at Tower). Pine infection in natural pine stands has been found in 12 counties as far north as Two Harbors in Lake County, west to Crow Wing County, and south to Washington County.

During 1928, infection scouting was conducted in the principal white pine stands in 14 counties in the northern part of the state. As a result, new infections were found on Ribes in 6 towns in 6 counties, and on pine in the town of Duluth, St. Louis County. In this town, 65 new pine infections and 222 black currant infections were located. The number of new Ribes infections in the other five counties varied from 1 to 18, the maximum number being in the town of Two River, Lake County. An extensive scouting project was conducted by Gray and Ritter during 1929. The survey extended northward from Hastings to International Falls, westward to Red Lake and Bemidji, and eastward to the state boundary. A record was kept of the amount of white pine reproduction and Ribes growth. As a result of this scout work, pine infection was found in 18 new locations in four towns. In addition, 229 infected Ribes nigrum were located in Duluth, and Ribes cynosbati were found diseased in five towns.

Future work: Application of adequate nursery sanitation measures to insure clean planting stock - outlawing of Ribes nigrum, and complete eradication of these bushes, especially in natural pine range - continuation of scouting to determine status of rust - conduct follow-up survey to inspect and map pine areas as determined by cartographical survey - application of control measures, especially in stands of young pine growth and re-eradication of early control areas, 4,981 acres - continuation of studies on pine infection and Ribes regrowth - educational and service activities conducted in cooperation with forestry officials and Extension Service.

SPECIAL SUMMARIES OF CONTROL ACTIVITIES
IN NEW ENGLAND AND NEW YORK DURING PERIOD 1922-1929, INCLUSIVE.

SUMMARY OF EDUCATIONAL AND SERVICE WORK PERFORMED BY THE
BLISTER RUST CONTROL AGENTS IN NEW ENGLAND AND NEW YORK
DURING THE PERIOD JULY 1, 1922 TO DECEMBER 31, 1929.
BASED ON YEARLY TOTALS FOR ALL STATES.

EDUCATION

	July-Dec. 1922	1923	1924	1925	1926	1927	1928	1929	Totals
Meetings addressed...	251	722	707	627	490	467	363	204	3,831
Attendance.....	29,163	32,649	47,071	45,522	33,082	34,690	28,178	23,729	274,084
Field Dem. meetings..	335	834	792	418	210	148	159	70	2,966
Attendance.....	1,732	6,442	4,050	2,912	5,018	2,646	2,809	1,898	27,507
Displays placed.....	374	582	647	680	624	647	492	358	4,404
Publications distributed.....	35,067	51,308	55,696	68,818	76,697	88,840	62,708	52,332	491,466
Wiregraphed Arti- cles distributed....	No Record Prior to 1928.....						14,953	23,155	38,108
Items published.....	313	1,203	1,269	1,294	1,202	1,219	1,109	769	8,378
Posters and signs placed.....	(Est) 2,500	6,499	13,868*	8,894	8,056	7,041	7,268	4,388	58,514

SERVICE

Initial interviews...	6,227	14,724	15,984	13,819	12,153	13,120	15,644	9,013	100,684
Follow-up calls.....	1,924	5,555	6,804	7,380	7,309	8,228	8,625	6,503	52,328
Individuals instructed in Disease and Damage	1,027	2,688	3,922	6,833	7,206	7,761	5,673	4,146	39,256
Individuals instructed in Control Methods..	513	1,586	2,276	4,336	4,353	5,341	3,279	2,595	24,279

*Includes 4315 posters mailed by the Boston Office to post
offices and railroad stations in the agent districts of
New England.

TOWN AND INDIVIDUAL COOPERATION IN RIBES ERADICATION WORK IN
NEW ENGLAND AND NEW YORK DURING THE PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	Town Cooperation		Individual Cooperation		
	No. Towns Cooperating	Amount Expended	No. Individuals Cooperating Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.	Amount Spent By Individuals
1922	59	\$16,150.39	-	971	\$28,783.42
1923	122	40,150.59	698	1,968	40,969.47
1924	147	47,822.14	1,714	3,059	45,698.43
1925	132	40,351.31	958	3,069	39,720.06
1926	123	41,223.95	741	3,283	44,172.88*
1927	125	38,299.74	894	3,537	49,040.81
1928	145	39,038.73	991	3,390	54,667.68
1929	156	41,323.28	1,016	3,353	50,449.29
Totals	1,009	\$304,360.13	7,012	22,630	\$353,502.04

(By States)

State	Town Cooperation		Individual Cooperation		
	No. Towns Cooperating	Amount Expended	No. Individuals Cooperating Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.	Amount Spent By Individuals
Maine	346	\$57,474.23	580	9,421	\$69,891.68
N. H.	638	238,898.82	-	476	34,119.43
Vt.	10	498.34	140	1,477	54,849.70*
Mass.	-	-	6,003	7,294	63,588.28
R. I.	-	-	34	2	31.36
Conn.	15	7,488.74	195	229	8,006.83
N. Y.	-	-	60	3,731	123,014.76
Totals	1,009	\$304,360.13	7,012	22,630	\$353,502.04

*Individuals in Vermont spent an additional \$82.00 for cultivated Ribes compensation.

SUMMARY OF RIBES ERADICATION IN NEW ENGLAND AND NEW YORK
DURING PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost To					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
1922	476621	4849812	16061	28783.42	16150.39	48683.66	3200.90	96818.37	.20	10.7
1923	892639	7969917	55074	40969.47	40150.59	76951.28	2812.53	160883.87	.18	9.0
1924	1008042	9466271	73858	45698.43	47822.14	71682.56	3972.39	169175.52	.167	9.4
1925	834428	7296670	59458	39720.06	40351.31	56251.26	2169.23	138491.86	.166	8.7
1926	814439	8838000	51471	44172.88	41223.95	60292.28	2693.80	148382.91	.182	10.8
1927	894501	8032574	48738	49040.81	38299.74	62552.15	3409.71	153302.41	.171	8.9
1928	879812	6677961	58223	54667.68	39038.73	60988.80	3311.52	158006.73	.18	7.6
1929	919755	7262127	74654	50449.29	41323.28	76827.92	2694.11	171294.60	.186	7.9
Total	6720237	6039332	437537	353502.04	304360.13	514229.91	24264.19	1196356.27	.178	9.0

(By States)

State	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost To					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Gov't.	Total	Cost	Ribes
Maine	2205094	14609891	97232	69891.68	57474.23	11726.06	18955.80	158047.77	.072	6.6
N. H.	1951884	22769096	73894	34119.43	238898.82	72668.91	-	345687.16	.177	11.7
Vt.	163134	1789002	5645	54849.70	498.34	9508.00	-	64856.04	.398	10.6
Mass.	1602116	9485293	210452	63588.28	-	143897.47	-	207485.75	.130	5.9
R. I.	180331	113435	7816	31.36	-	12399.62	1380.76	13811.74	.077	0.6
Conn.	206421	1581108	17203	8006.83	7488.74	33327.40	3912.63	52735.60	.255	7.7
N. Y.	411257	10045507	25295	123014.76	-	230702.45	15.00	353732.21	.860	24.4
Totals	6720237	60393332	437537	353502.04	304360.13	514229.91	24264.19	1196356.27	.178	9.0

SUMMARY OF RIBES ERADICATION WORK IN COOPERATION WITH INDIVIDUALS
IN NEW ENGLAND AND NEW YORK DURING PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost To					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
1922	93828	2886282	8251	28035.13	820.78	10769.74	-	39625.65	.422	30.8
1923	174875	3954508	31338	40969.47	6910.47	16356.29	-	64236.23	.367	22.6
1924	205084	4235627	37532	44622.07	8000.65	18263.02	-	70885.74	.345	20.6
1925	209831	3567024	44811	39720.06	7089.87	21301.74	16.67	68128.34	.325	17.0
1926	241686	5485072	36075	44172.88	6747.56	24909.27	264.90	76094.61	.315	22.7
1927	291611	4993488	34066	49011.06	8375.41	28532.54	-	85939.01	.295	17.0
1928	323218	4027921	37104	54667.68	8089.87	30180.65	315.88	93254.08	.289	12.5
1929	282152	4293474	40216	50374.79	7010.13	36164.24	100.00	93649.16	.332	15.2
Tot.	1822285	33443396	269393	351573.14	53044.74	186497.49	697.45	591812.82	.325	18.4

(By States)

State	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost To					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Maine	275869	14183214	95348	69891.68	52117.40	64.17	16.67	122089.92	.443	51.4
N. H.	127618	3015008	8652	34119.43	429.00	8805.00	-	43353.43	.340	23.6
Vt.	159811	1751668	5425	54849.70	498.34	7692.50	-	63040.54	.394	11.0
Mass.	857147	7068146	134417	63588.28	-	59854.80	-	123443.08	.144	8.2
R. I.	540	2175	1000	31.36	-	94.72	-	126.08	.23	4.0
Conn.	52279	287967	4696	6077.93	-	5211.57	665.78	11955.28	.229	5.5
N. Y.	349021	7135218	19855	123014.76	-	104774.73	15.00	227804.49	.653	20.4
Tot.	1822285	33443396	269393	351573.14	53044.74	186497.49	697.45	591812.82	.325	18.4

SUMMARY OF RIBES ERADICATION WORK IN COOPERATION WITH TOWNS
IN NEW ENGLAND DURING THE PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost				Per Acre	
		Wild	Cult.	Towns	State	Govt.	Total	Cost	Ribes
1922	156,045	1,218,793	7,551	\$16,077.90*	\$6064.96	-	\$22142.86*	\$.142	7.8
1923	251,821	3,058,288	20,718	33,240.12	14485.22	-	47725.34	.189	12.1
1924	326,341	3,991,645	16,071	40,897.85**	14878.27	-	55776.12**	.169	12.2
1925	251,669	2,983,216	6,118	33,075.04	8271.20	-	41346.24	.164	11.8
1926	208,346	2,896,113	3,086	34,476.39	10583.68	-	45060.07	.216	13.4
1927	220,576	2,447,492	2,572	29,924.33	11416.16	-	41340.49	.187	11.1
1928	218,986	1,972,634	6,013	30,948.86	8043.37	-	38992.23	.173	9.1
1929	260,266	2,236,875	14,987	34,313.15	9399.28	\$817.55	44529.98	.171	8.6
Tot.	1,894,050	20,805,106	77,116	252,953.64	83142.14	817.55	336913.33	.178	11.0

* Includes \$748.29 raised by individuals in Connecticut.

** " 1076.36 " " " " "

(By States)

State	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost				Per Acre	
		Wild	Cult.	Towns	State	Govt.	Total	Cost	Ribes
Maine	9228	232,256	1,143	5,170.43	-	-	5170.43	.560	30.6
N. H.	1819356	19,519,410	64,633	238,469.82	61734.39	-	300204.21	.165	10.7
Conn.	65456	1,003,440	11,340	9,313.39	21407.75	817.55	31538.69	.482	15.3
Tot.	1894050	20,805,106	77,116	252,953.64	83142.14	817.55	336913.33	.178	11.0

SUMMARY OF STATE SCOUT WORK ON INDIVIDUALS' LANDS
IN NEW ENGLAND DURING PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost				Per Acre	
		Wild	Cult.	States	Govt.	Indiv.	Total	Cost	Ribes
1922	218,736	294,023	259	\$5,178.51	\$3,200.90	-	\$8,379.41	.039	1.3
1923	457,209	233,169	2,999	12,032.26	2,812.53	-	14,844.79	.033	0.5
1924	460,739	131,233	20,143	12,076.07	3,972.39	-	16,048.46	.035	0.3
1925	366,763	476,012	8,440	17,217.42*	2,152.56	-	19,369.98*	.053	1.2
1926	346,010	106,194	11,620	11,257.44	2,428.90	-	13,686.34	.039	0.31
1927	368,161	126,354	8,575	10,398.61**	3,409.71	-	13,808.32**	.037	0.34
1928	318,502	76,756	10,766	12,319.26	2,678.39	-	14,997.65	.048	0.24
1929	338,247	111,510	14,285	11,506.99	1,776.56	\$74.50	13,358.05	.040	0.4
Tot.	2,874,367	1,555,251	77,087	\$91,986.56	\$22,431.94	\$74.50	\$114,493.00	.040	0.54

(By States)

State	No. Acres Cleared Of Ribes	Ribes Destroyed		Cost				Per Acre	
		Wild	Cult.	States	Govt.	Indiv.	Total	Cost	Ribes
Maine	1,919,857	128,908	597	\$11,794.43	\$18,939.13	-	30,733.56	.016	.07
Mass.	691,930	1,038,064	68,640	61,731.04	-	-	61,731.04	.089	1.5
R. I.	179,010	105,034	6,746	12,180.90	1,380.76	-	13,561.66	.076	0.6
Conn.	83,570	283,245	1,104	6,280.19	2,112.05	\$74.50	8,466.74	.101	3.4
Tot.	2,874,367	1,555,251	77,087	91,986.56	\$22,431.94	\$74.50	\$114,493.00	.040	0.54

*Includes \$186.40 town money expended in Maine during 1925.

**Includes \$29.75 individual money expended in Connecticut during 1927.

No such work performed in New York.

In addition to the above, 140 acres were cleared of 15,513 wild and 144 cultivated Ribes at a cost of \$53.86 in the application of regulatory measures in Maine during 1927, 1928 and 1929.

SUMMARY OF RIBES ERADICATION WORK ON PUBLIC LANDS IN NEW ENGLAND
AND NEW YORK DURING PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	No. Acres Cleared Of Ribes	Ribes Destroyed		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
1922	8,012	450,714	-	\$ 26,670.45	\$3.33	56.3
1923	8,734	723,952	19	34,077.51	3.90	62.9
1924	15,876	1,107,766	112	26,465.20	1.66	69.8
1925	6,165	270,418	89	9,647.30	1.56	40.6
1926	18,397	350,621	690	13,541.89	.736	19.1
1927	14,098	463,853	3,381	12,197.66	.365	32.9
1928	19,091	600,383	4,340	10,753.77	.563	31.4
1929	39,020	606,354	5,166	19,729.48	.506	15.5
Totals	129,395	4,574,066	13,797	153,083.26	1.183	35.3

(By States)

State	No. Acres Cleared Of Ribes	Ribes Destroyed		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Maine	-	-	-	-	-	-
N. H.	4,900	234,678	609	\$2,129.52	.435	47.9
Vt.	3,323	37,334	220	1,815.50	.546	11.2
Mass.	53,039	1,379,083	7,395	22,311.63	.421	26.0
R. I.	781	6,226	70	124.00	.159	8.0
Conn.	5,116	6,456	63	774.89	.151	1.3
N. Y.	62,236	2,910,289	5,440	125,927.72	2.023	46.8
Totals	129,395	4,574,066	13,797	153,083.26	1.183	35.3

The total cost of the work on public lands was paid from state funds, except \$317.25 federal money expended in Connecticut during 1928.

SUMMARY. BY STATES, OF ACRFAGE RE-ERADICATED OF RIBES IN NEW ENGLAND
AND NEW YORK DURING PERIOD 1923-1929, INCLUSIVE.

State	1923	1924	1925	1926	1927	1928	1929	Totals
Maine	20	1,240	644	728	1,010	708	232	4,582
N. H.	630	6,668	41,734	32,046	74,034	83,201	96,425	334,738
Vt.	1,240	974	1,396	5,850	2,315	2,292	3,005	17,072
Mass.	16,943	1,311	4,256	6,145	14,942	15,875	16,336	75,808
R. I.	3,240	5,000	0	2,670	0	0	0	10,910
Conn.	0	0	2,370	570	8,836	1,124	6,203	19,103
N. Y.	0	0	0	0	0	10,395	9,291	19,686
Totals	22,073	15,193	50,400	48,009	101,137	113,595	131,492	481,899

No record of any re-eradication work prior to 1923. Detailed figures as to Ribes and costs are not available, except for 1926-1929, inclusive, and Ribes and cost figures are lacking for the 1926 re-eradication work in Massachusetts. A summary for 1929 is given in this report on pages to

SUMMARY OF STATE COMPENSATION PAID YEARLY FOR CULTIVATED RIBES
DESTROYED IN NEW ENGLAND AND NEW YORK DURING THE PERIOD 1922-1929, INCLUSIVE.

(By Years)

Year	Total Number Cultivated Ribes Removed	Number Bushes For Which Compensation Was Actually Paid	Number Persons Receiving Compensation	Amount Paid In Reimbursement
1922	16,061	727	50	\$289.49
1923	55,074	1,490	59	574.37
1924	73,858	6,106	84	1,572.11
1925	59,985	1,310	46	506.91
1926	51,500	4,023	24	1,449.60*
1927	50,817	4,544	143	1,731.96
1928	69,825	3,245	181	1,279.04
1929	86,868	3,310	463	1,445.81
TOTALS	463,988	24,755	1,050	\$8,849.29

(By States)

State	Total Number Cultivated Ribes Removed	Number Bushes For Which Compensation Was Actually Paid	Number Persons Receiving Compensation	Amount Paid In Reimbursement
Maine	97,232	0	0	0
N. H.	73,894	558	22	127.47
Vt.	5,645	1,339	110	647.16*
Mass.	215,588	19,570	310	6,827.75
R. I.	14,425	94	7	35.85
Conn.	18,275	61	4	27.25
N. Y.	33,929	3,133	597	1,183.81
TOTALS	463,988	24,755	1,050	8,849.29

*In addition, during 1926, individual cooperators in Vermont paid \$82.00 compensation to 9 owners of cultivated Ribes for the removal of 164 bushes.

In Massachusetts, during 1929, 77 persons claimed \$1,009.10 for the destruction of 2,381 bushes. These claims will not be settled until the spring of 1930. However, this Massachusetts data are included in the above tables.

Total number of cultivated bushes destroyed during years 1925-1929, inclusive, include such bushes pulled in connection with special projects (black currant eradication or nursery sanitation) in Massachusetts, Rhode Island, Connecticut, and New York. Cultivated bushes pulled on such special projects not included in eradication summaries in this report.

EXPENDITURES - EASTERN CONTROL PROGRAM

Calendar Year	Federal	State					All Others	Total	Grand Totals
		State Appropriations	Nursery Funds	Towns	Individuals				
1922	\$77,377.30*	\$93,537.07*	\$500.00	\$16,150.39	\$28,783.42		-	\$138,970.88	216,348.18
1923	118,808.49	113,069.81	500.00	40,150.59	40,969.47		\$6,139.10	200,828.97	319,637.46
1924	122,831.96	117,121.46	882.50	47,822.14	45,698.43		7,125.03	218,649.56	341,481.52
1925	131,098.84	100,352.25	753.31	40,351.31	39,720.06		1,695.47	182,872.40	313,971.24
1926	130,268.07	105,917.41	614.58	41,223.95	44,254.88**		2,027.44	194,038.26	324,306.33
1927	132,460.90	120,566.14	3,213.41	38,299.74	49,040.81		1,767.50	212,887.60	345,348.50
1928	131,129.82	125,671.02	3,993.17	39,038.73	54,667.68		627.19	223,997.79	355,127.61
1929	120,139.95	134,292.63	3,256.79	41,323.28	50,449.29		2,201.88	231,523.87	351,663.82
TOTALS	\$964,115.33	\$910,527.79	\$13,713.76	\$304,360.13	\$353,534.04		\$21,583.61	\$1,603,769.33	2567,884.66

*Figures for 1922 Federal and state appropriation expenditures taken from summary prepared by C.J.P. - 5/1/28.

**Includes \$82.00 spent by individuals in Vermont for cultivated Ribes compensation.

RIEBS ERADICATION WORK ON WHITE MOUNTAIN NATIONAL FOREST
1924-1929, INCLUSIVE.

(Data from Mr. Yarnall's letters of 12/22/27 and 1/14/28 to E. C. Filler)

Year	Acreage Examined	Ribes Pulled	Total Cost	Per Acre	
				Ribes	Cost
1924	4,944	61,516	\$1,702.96	12.4	\$.363
1925	466	49,619	310.63	106.5	.667
1926	748	20,071	154.92*	26.8	.207
1927	226	11,350	102.73	50.2	.455
TOTALS	6,384	142,556	\$2,271.24	22.3	\$.356

*The State of New Hampshire paid \$12.38 of this expense.

Note: The scouting costs during 1924 were abnormally high, being based on actual expenditures for salaries and expenses of Hodgkins and Black, who cost much more than ordinary scouts. Also, there was possibly some duplication of effort in using two scouts, but this was unavoidable, as Hodgkins was training Black in field methods.

No work done during 1928 and 1929.

SUMMARIES OF TOWN AND INDIVIDUAL COOPERATION
IN NEW ENGLAND AND NEW YORK DURING PERIOD 1917-1929, INCLUSIVE.

Note: In the following tables, the amounts listed for individual cooperation do not agree with those given in the preceding Ribes eradication summaries, due to the fact that the control tables include only individual funds expended in eradicating Ribes, while the following summaries represent all expenditures by individuals. A single exception occurs in the following New York summary, which does not include \$3664.20 spent by individuals in 1922 on unsupervised Ribes eradication work.

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION
IN NEW ENGLAND AND NEW YORK DURING PERIOD 1917-1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917	-	5	\$42.86	-	-
1918	-	16	\$6133.45	43	\$7,200.00
1919	-	55	\$11,960.56	38	\$6,310.00
1920	-	168	\$9,650.14	51	\$8,500.00
1921	-	142	\$12,852.07	34	\$5,550.00
1922	-	971	\$25,119.22*	59	\$19,827.86
1923	698	1968	\$40,969.47	122	\$36,380.00
1924	1714	3059	\$45,698.43	147	\$47,352.81
1925	958	3069	\$39,720.06	132	\$40,989.90
1926	741	3283	\$44,254.88**	123**	\$40,425.00***
1927	894	3537	\$49,040.81	125	\$38,133.40
1928	991	3390	\$54,667.68	145	\$41,126.60
1929	1016	3353	\$50,449.29	156****	\$41,385.23****
Totals	7012	23,016	\$390,558.92	1175	\$333,180.80

* Does not include \$3664.20 expended by individuals in New York on unsupervised Ribes eradication work.

** Includes \$82.00 spent by individuals in Vermont for cultivated Ribes compensation.

*** In five additional towns in Maine (not appropriating in 1926) \$548.77 was available for control work from balance of 1925 appropriations.

**** In two additional towns in New Hampshire (not appropriating in 1929) \$457.90 was available for control work from balances of 1928 appropriation.

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION IN
PLISTER RUST CONTROL WORK IN MAINE 1917-1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917-1920	-	-	-	-	-
1921	-	30	\$1,163.07	-	-
1922	-	464	\$4,409.32	8	\$1,300.00
1923	58	1090	\$8,760.34	39	\$7,115.00
1924	94	1607	\$10,619.58	49	\$8,154.25
1925	47	1548	\$9,337.30	51	\$8,000.00
1926	168	1317	\$9,612.67	40*	\$6,725.00*
1927	138	1234	\$9,324.06	43	\$8,277.00
1928	40	1050	\$9,567.09	61	\$10,717.00
1929	35	1111	\$8,261.32	55	9,485.27
Totals	580	9451	\$71,054.75	346	\$59,773.52

*In five additional towns (not appropriating in 1926) \$548.77 was available for control work from balances of 1925 appropriations. Also, in four towns appropriating in 1926, \$47.51 was available from 1925 funds.

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION IN
BLISTER RUST CONTROL WORK IN NEW HAMPSHIRE 1917-1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917	-	5	\$42.86	-	-
1918	-	8	\$810.95	43	\$7,200.00
1919	-	34	\$2,053.65	38	\$6,310.00
1920	-	97	\$4,764.37	50	\$8,000.00
1921	-	23	\$2,688.51	31	\$4,350.00
1922	-	148	\$8,004.82	49	\$16,800.00
1923	-	121	\$7,635.45	82	\$28,765.00
1924	-	46	\$2,582.27	96	\$38,975.00
1925	-	30	\$2,090.76	78	\$32,725.00
1926	-	19	\$2,734.86	81	\$33,375.00
1927	-	45	\$3,722.34	77	\$28,800.00
1928	-	37	\$4,534.14	80	\$28,700.00
1929	-	30	\$2,814.79	95*	\$29,300.00*
Totals	-	643	\$44,479.77	800	\$263,300.00

*In two additional towns (not appropriating in 1929) \$457.89 was available for control work from balances of 1928 appropriation.

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION IN
BLISTER RUST CONTROL WORK IN VERMONT
1917 - 1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917-1918	-	-	-	-	-
1919	-	1	\$270.00	-	-
1920	-	29	\$515.61	-	-
1921	-	31	\$3,235.50	-	-
1922	-	125	\$5,502.22	-	-
1923	3	220	\$7,247.34	-	-
1924	27	246	\$7,392.74	1	\$100.00
1925	38	258	\$8,137.50	3	264.90
1926	53	162	\$7,923.94*	1	75.00
1927	15	118	\$7,106.05	3	56.40
1928	-	222	\$5,829.97	1	109.60
1929	4	126	\$5,791.94	1	100.00
Totals	140	1,538	\$58,952.81	10	\$705.90

*Includes \$82. expended by individuals for cultivated Ribes compensation.

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION IN
BLISTER RUST CONTROL WORK IN MASSACHUSETTS
1917 - 1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917-1918	-	-	-	-	-
1919	-	15	\$1,575.00	-	-
1920	-	31	\$1,877.22	1	\$500.00
1921	-	35	\$2,434.00	3	\$1200.00
1922	-	194	\$3,222.67	-	-
1923	586	470	\$6,894.90	-	-
1924	1564	980	\$11,527.04	-	-
1925	873	890	\$5,554.15	-	-
1926	507	1335	\$8,302.76	-	-
1927	678	1379	\$8,459.42	-	-
1928	951	1081	\$9,443.65	-	-
1929	844	965	\$10,183.69	-	-
TOTALS	6003	7375	\$69,474.50	4	\$1700.00

SUMMARY OF INDIVIDUAL COOPERATION IN BLISTER
RUST CONTROL WORK IN RHODE ISLAND
1917 - 1929.

Year	No. Individual Cooperators		Amount Spent by Individual Cooperators
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.	
1917	-	-	-
1918	-	6	\$550.00
1919	-	-	-
1920	-	-	-
1921	-	-	-
1922	-	-	-
1923	34	1	\$15.36
1924	-	1	\$16.00
1925	-	-	-
1926	-	-	-
1927	-	-	-
1928	-	-	-
1929	-	-	-
TOTALS	34	8	\$581.36

SUMMARY OF TOWN AND INDIVIDUAL COOPERATION IN
BLISTER RUST CONTROL WORK IN CONNECTICUT
1917 - 1929.

Year	No. Individual Cooperators		Amount Spent by Individual Cooperators	No. Towns Appropriating	Amount Appropriated
	Cult Ribes Erad. Only	Wild & Cult. Ribes Erad.			
1917-1921	-	-	-	-	-
1922	-	2	\$760.29	2	\$1727.86
1923	17	9	\$867.45	1	\$500.00
1924	29	18	\$1139.51	1	\$123.56
1925	-	23	\$80.00	-	-
1926	13	80	\$1411.80	1	\$250.00
1927	3	47	\$1470.39*	2	\$1000.00
1928	-	34	\$1950.64	3	\$1600.00
1929	133	16	\$326.75	5	\$2499.96**
TOTALS	195	229	\$8006.83	15	\$7701.38

*Includes cost of time of 20 individuals (\$29.75) who assisted in scout work in Connecticut. In addition, \$500. was raised by individuals in one town in Connecticut.

**Includes \$1424.83 subscribed by individuals in four towns.

SUMMARY OF INDIVIDUAL COOPERATION IN
BLISTER RUST CONTROL WORK IN NEW YORK
1917 - 1929.

Year	No. Individual Cooperators		Amount Spent By Individual Cooperators
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.	
1917	-	-	-
1918	-	2	\$4,772.50
1919	-	5	\$8,061.91
1920	-	11	\$2,492.94
1921	-	23	\$3,330.99
1922	-	38	\$3,219.90*
1923	-	57	\$9,548.63
1924	-	161	\$12,421.29
1925	-	320	\$14,520.35
1926	-	370	\$14,268.85
1927	60	714	\$18,958.55
1928	-	966	\$23,342.19
1929	-	1105	\$23,070.80
TOTALS	60	3772	\$138,008.90

*Does not include \$3664.20 spent by individuals on unsupervised Ribes eradication work.

SPECIAL TOTAL SUMMARIES OF RIBES ERADICATION
IN NEW ENGLAND AND NEW YORK.

SUMMARY OF RIBES ERADICATION WORK IN NEW ENGLAND AND
NEW YORK DURING PERIOD 1917 - 1929.

(By Years)

Year	Acres Eradicated	Ribes Destroyed		Total Cost	Per Acre Values	
		Wild	Cult.		Ribes	Cost
1917	262,562	861,353*	69,514	\$65,481.24**	3.3	\$.371
1918	137,453	2,413,887	22,150	99,388.20***	18.8	.72
1919	252,043	4,549,948	27,877	137,117.05	18.2	.54
1920	270,657	4,243,983	25,936	84,843.80	15.8	.31
1921	376,745	3,191,967	15,755	68,093.70	8.5	.18
1922	476,621	4,849,812	16,061	96,818.37	10.7	.20
1923	892,639	7,969,917	55,074	160,883.87	9.0	.18
1924	1,008,042	9,466,271	73,858	169,175.52	9.4	.167
1925	834,428	7,296,670	59,458	138,491.86	8.7	.166
1926	814,439	8,838,000	51,471	148,382.91	10.8	.182
1927	894,501	8,032,574	48,738	\$153,302.41	8.9	.171
1928	879,812	6,677,961	58,223	158,006.73	7.6	.180
1929	919,755	7,262,127	74,654	171,020.27	7.9	..186
TOTALS	8,019,702	75,654,470	598,769	1,651,005.93	9.4	.208

*No Ribes figure for Connecticut in 1917.

**No cost figure for Massachusetts in 1917.

***No cost figure for Connecticut in 1918.

NOTE: Connecticut acreage for 1917 omitted in obtaining per acre Ribes figure for 1917 and grand total.

Massachusetts acreage for 1917 omitted in obtaining per acre cost figure for 1917 and grand total.

Connecticut acreage for 1918 omitted in obtaining per acre cost figure for 1918 and grand total.

(Summary does not include work done on White Mountain National Forest)

Results Accomplished Up To April 1, 1930, On The Cartographical
Survey Work Assigned To The Boston Office Of Blister Rust Control.

Relation of Distribution and Abundance of Native White Pine to Spread of Rust.

I. Field Records

- A. Field data secured for all towns in New England, New York, New Jersey, Pennsylvania, Wisconsin, Minnesota, and Michigan.
(Data recorded on BR36 forms.)

II. Summarization of Records

A. Tabular Data

- (1) Data tabulated by acreage of forest types in each town, county, and state. (New England States, New York, Wisconsin, Minnesota, Michigan, and Pennsylvania - In latter state, only pine data summarized. Copy of Vermont data sent to Ross. Copies of the summary sheets have also been completed for Maine, Rhode Island, and Connecticut; also, for 4 of the 10 counties in New Hampshire; 10 of the 14 counties in Massachusetts; and 56 of the 83 counties in Michigan.)
- (2) Data for New York white pine plantations compiled by towns and number of pines planted. (These records checked at Albany Office. Acreage of pine plantations added to forest area in each town. Total summary of New York pine plantations prepared and copies furnished Albany and Washington Offices.)
- (3) Special total summaries and charts of forest types, particularly white pine, made for New England and New York. (Copies sent to Messrs. Detwiler and Howard.)
- (4) Field sheets for Pennsylvania and New Jersey checked. Acreage of pine towns in Pennsylvania obtained by planimetering base maps.

B. Maps

- (1) Map of New England and New York showing, by towns, the percent of land area in forest growth, the two major forest types, and percent of forest area in pure pine (merchantable and reproduction) and mixed pine types.
- (2) Map of New England and New York showing acreage of pine in each town. (Acreages grouped into ten classes, depicted by colors.)

Relation of Distribution and Abundance of Wild Ribes to Spread of Rust.

I. Summarization of Records

A. Tabular Data

- (1) Ribes eradication by towns for period 1917 to 1929, inclusive - also, totals for states.
- (2) Ribes species by towns.

B. Maps

- (1) Map of New England and New York showing Ribes conditions and percent of pine area protected in each town (1917 to 1926, inclusive.)
- (2) Map of New England and New York showing Ribes species occurring in each town.
- (3) Series of seven maps of New England and New York, each map showing distribution of a certain species of wild Ribes. (These maps sent to Dr. Pennington.)
- (4) Map of New England and New York showing, by towns, the estimated number of wild Ribes per acre. (Number grouped into classes and depicted by colors.)
- (5) Zone map showing number of wild Ribes per acre in New England and New York, based on map (4). Reproductions obtained and copy sent to Washington Office.
- (6) Map of New England and New York showing the percentage of the control area in each town that has been cleared of Ribes up to 1928 inclusive. A similar map to show the status of control work was prepared later to include the Ribes eradication work performed during 1929. - Copies sent to Washington.

Relation of Distribution and Abundance of Pine Infection to Other Factors
Influencing The Spread of The Rust.

I. Summarization of Data

A. Maps

- (1) Map of New England and New York showing estimated percent of pine infection in each town. (Number grouped into classes and shown by colors.)
- (2) Zone map of New England and New York showing estimated percentage of pine infection, based on map (1) - Reproduction obtained and copies sent to Washington.

- (3) Same as (2), except acreages grouped into four classes instead of ten - (only Maine and New Hampshire completed.)
- (4) Map of New England and New York showing percent of land area of each town in pine. (Percents grouped into four classes and shown by colors.)
- (5) Zone map showing pine conditions in New England and New York, based on percent of land area in pine growth in each town - Reductions prepared and copy sent to Washington Office. In 1929, this zone map was revised on larger scale to correspond to other zone maps.
- (6) Series of maps showing pine conditions in Michigan - 1925.
 - a.-Estimated acreage of pure natural white pine in each town.
 - b.-Estimated acreage of mixed natural white pine in each town.
 - c.-Estimated acreage of pure and mixed natural white pine in each town.
 - d.-Estimated acreage of white pine plantations in each town.

One set prepared and sent to Washington Office, where additional copies were made and sent to Mandenberg.

- (7) Series of maps showing pine conditions in Pennsylvania - 1927.
 - a.-Estimated acreage of pure natural white pine in each town.
 - b.-Estimated acreage of mixed natural white pine in each town.
 - c.-Estimated acreage of pure and mixed white pine (natural and plantations) in each town.
 - d.-Estimated acreage of white pine plantations in each county.

Four sets prepared, and a set sent to each of the following: Wirt, McCubbin, and Washington Office. One set retained at Boston Office.

